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See Page 655 for Means of Making Mine Car Safe For Modern Haulage

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COAL AGE

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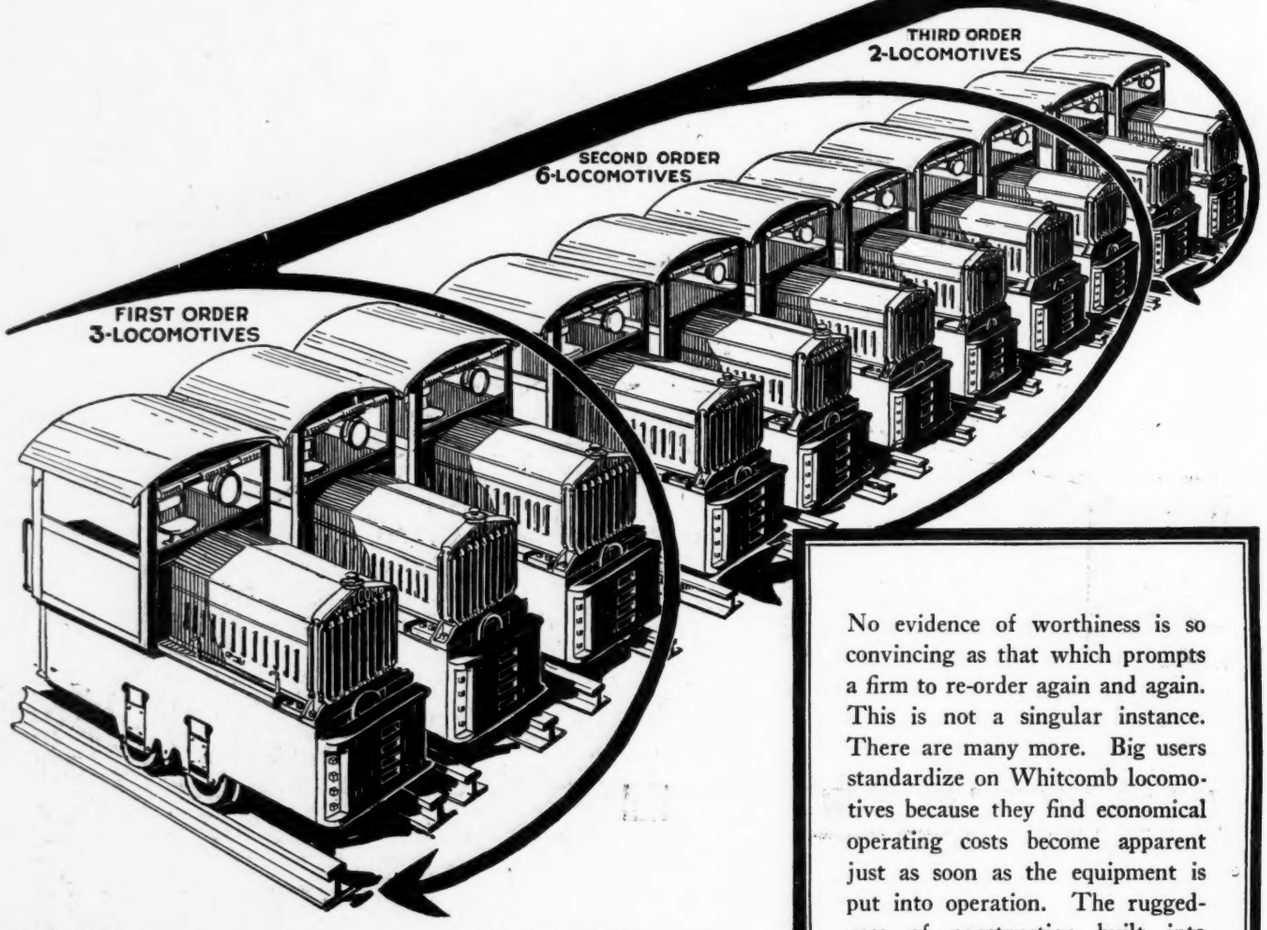

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COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24 NEW YORK, THURSDAY, NOVEMBER 1, 1923 Number 18

Dividing the Spoils

ANTHRACITE mine workers are complaining that since they got their 10 per cent wage advance, their landlords have been raising rents, barbers charging more and the cost of living generally has been going up for them. It is not surprising that these beneficiaries of Governor Pinchot should complain that they are being called upon to share their gains and thus to increase the prosperity of their home towns. It would have been surprising indeed if the merchants and landlords had not set about to garner to their coffers as much as possible of Pinchot's $40,000,000 gift.

We shall await with interest to learn whether Mr. Pinchot, having been notified that other citizens of Pennsylvania have taken to themselves the 10 per cent increase he gave the miners, will then call in the operators and announce that another increase is justified, due, and must be forthwith granted.

Do Strikes Pay?

DESPITE the five months' strike the production of bituminous coal in 1922 exceeded that of 1921 by more than 6,000,000 tons, and the average number of days worked the country over was 142, only 7 days less than the 149 in 1921. More tons in less days meant more men. The net gain in men employed—from 663,700 in 1921 to 687,900 in 1922—was 24,200.

Compared with 1921, Illinois last year lost 11,000,000 tons of coal output, followed by Ohio with a drop of 5,000,000 tons, Pennsylvania with 3,000,000 tons, Wyoming and Indiana with about 1,000,000 each, and Kansas and Missouri with losses between 500,000 and 1,000,000 tons. The total of these is about 22,500,000 tons.

Turning to the gains, which were in the aggregate sufficient to overbalance the strike losses in other fields and add 6,000,000 tons, we find Kentucky leading with 10,000,000 tons over 1921, West Virginia with 8,000,000, Alabama with 6,000,000, Virginia with 3,000,000 and Colorado and New Mexico with nearly 2,000,000 between them. There was little difference in output in the two years in Iowa, Montana, Maryland, and some other states.

Alabama employed 2,000 more men; Kentucky, 10,000; West Virginia, 8,000, and Virginia, 1,000 more than 1921. The men in Alabama worked 49 more days than in 1921, those in Virginia 32 more, but the greater number of men in Kentucky worked 12 less and in West Virginia 6 less on the average than in 1921, when there was no general strike.

It is perhaps surprising that all the furor of the big strike of 1922 had no greater influence in price than is shown by the figures for average realization published by the Geological Survey. The average value per ton of all bituminous coal at the mine in 1922 was $3.02, a gain of 13c. over 1921. Kentucky received an average of 33c. per ton more than in 1921; West Virginia 9c. more. Alabama coal averaged 74c. less per ton and Virginia coal 48c. less in the strike year than in 1921.

Thus the big strike brought more mine workers by the thousands into the soft-coal industry, all in the non-union fields, where the expansion was possible. It proved no bonanza period for the non-union producers as a whole, for with prices held down and no more opportunity to work than in as dull a year as 1921 there was little of the golden opportunity that is supposed to confront them when the union mines are on strike. Of course it must be remembered that the railroad men in the South were on strike if the coal miners were not, and this affected the returns for 1922 to a certain extent.

Spuds

THE world is small after all. Here is the farmer whose woes are concerning the politicians—he has trouble with the price of wheat, the boll weevil, and now we learn that with potatoes all is not well. Some seventy million bushels of potatoes rotted in the ground, undug, last year. Yet, according to the *Country Gentleman*, only a normal number of bushels reached the market, at prices particularly ruinous to the individual grower. This publication for the dirt farmer goes on to say that those undug potatoes—and the farmer—broke the market. Spurred on by rumors that there was a general overproduction he hastened his digging and by his very energy in getting them on the market, broke prices so that it did not pay to dig the rest. No matter how low the price, there is a limit to the bushels of potatoes the country will buy and use.

This country is saturated with soft coal. Stocks are abnormally high. The mines have been kept in operation throughout the summer and the price each week has slumped lower. What is breaking the price? Why is it that last week the Shipping Board was offered 1,800 tons of high-grade low-volatile coal at $1.02 per net ton at the mines—coal that doubtless cost nearly $3 per ton to produce?

The answer is the same for potatoes and coal—more produced than required. The farmer who this year lost money on potatoes may turn to another crop next year and make a profit. The coal operator who in such a market digs coal and ships it unsold is more foolish than the farmer because the coal will not rot if left in the ground for another season—that is to say more foolish unless he is consciously riding the market down in the hope of proving a better stayer than some other fellow and thus testing out the theory of the survival of the fittest.

We believe it is an idle dream to imagine that the farmers can ever be brought to the point of sowing a crop to fit the market, no more, no less, if for no other reason than because no one can ever gage in advance the requirements accurately. Nor can we ever reach such

perfection in coal-mine capacity and production that we may foresee and entirely forestall "no bills" and distress coal on the one hand and panic prices on the other.

If the farmer will read the signs of the times and act concertedly he may help himself—so may the coal operator when he gets the same treatment under the Sherman Law.

Regulation of the Consumer

COAL salesmen who have trouble disposing of small sizes may look forward to the day when they may take the attitude displayed by the operators of the "Coal River Collieries." This company, it will be recalled, is the Brotherhood of Locomotive Engineers and has mines in West Virginia and western Kentucky. The stock in this enterprise is owned by members of the organization and the company specializes in car-lot sales of coal to its stockholders. This is excellent, for it is effectual education for these men in some features of the coal business.

For instance, in the October issue of the *Locomotive Engineers' Journal*, Grand Chief Engineer Stone advises that much confusion and dissatisfaction is caused by the invariable demand for lump coal, "the very highest price coal there is." He urges that run-of-mine is the best, costs $1 less per ton, but that "if you must have lump coal, then order egg or nut size, which is still cheaper than the large lump coal." His argument is that "if you follow these suggestions, you will burn less fuel, have more heat, and save a big percentage in the cost of your fuel bill. Try it once and be convinced."

If commercial operators could tell their customers, "If you must have lump, order nut or egg," a part of their troubles would be over. That is regulation of consumption and would follow, as the night the day, any regulation of coal production and distribution.

The Perennial Optimist

SOMEONE has said that the surest way to go broke is to "go short" on the United States, which is but another way of saying that the upward surge of business and industry in this country has always overcome temporary depression and mounted yet higher. In his annual address to the American Iron and Steel Institute last week Judge Gary again gave utterance to his unfailing faith in prosperity. He always manages to see the bright side of things, and who will venture to say that his predictions have not proved his wisdom?

"It may be stated with confidence that the outlook is good," he says this year, and if the outlook is good for iron and steel it must be good for coal in so far as tonnage is concerned. According to Judge Gary, the iron and steel industry will show considerable profit this year, though not as much as the capital invested should produce. This is not what the coal industry has to show for this year, despite the excellent showing on production. The hard-coal branch is the better off, as prices have been sustained at a profitable level, strike losses in September being the only detracting factor.

The soft-coal industry, however, has poured coal onto the market at continually lowering prices and the average return has not be remunerative, though many companies have had a good year. The prediction that business is not going to pot because of Europe's troubles and that the outlook is good will hearten those in the coal trade who are hanging on by a thread, for a continuation of present conditions will weed out the weak and in the end produce a healthy trade for those fitted and equipped to survive.

Culpable but Not Criminal

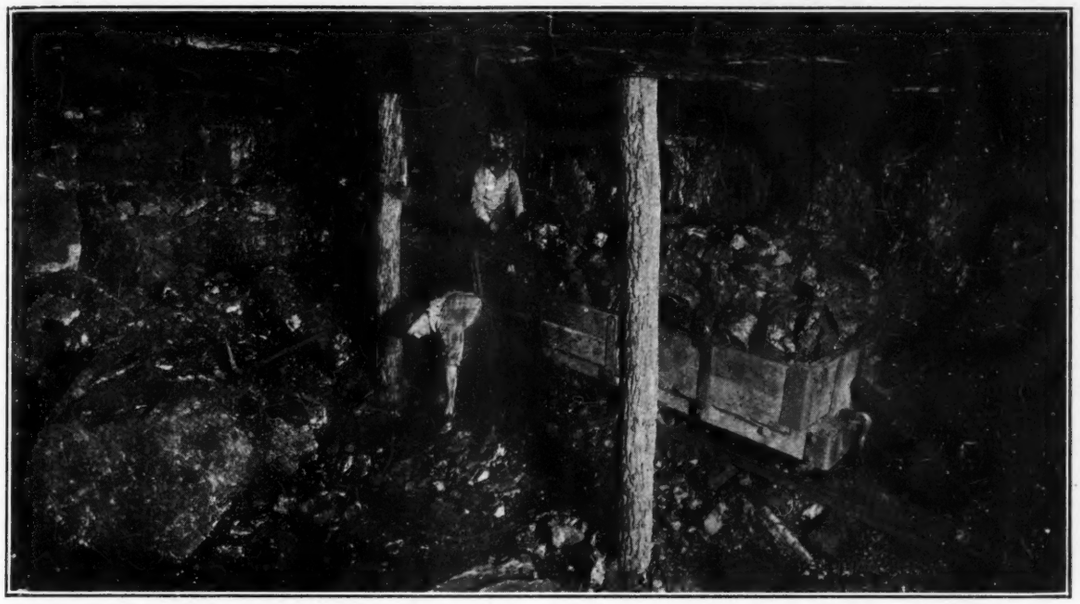
IT IS easy to understand why the Coal Commission displayed such choler in its report on the wholesale coal trade. Its investigations brought to light the intimate details of a series of deals in which coal, notably anthracite, was passed from hand to hand at increasing prices and by those who made serious attempts to conceal their activities. There is nothing to be said in extenuation, for instance, of the resort to split commissions as a method of getting round the prices set in the gentlemen's agreement known as the Pennsylvania Fair Prices of 1922. The best that can be said for those who sought to reap large profits by diverting company coal at premium prices and otherwise indulging in "backdoor" selling of coal is that they violated no law.

The crux of the whole matter is that the Commission, finding such plain evidence of extortion, waxes exceeding wroth because it could lay its hand on no panacea for this evil. It unfairly ties its recital of these abuses onto its story of the coal wholesalers and thus indicts that branch of the coal industry. Its own evidence includes producers, wholesalers and retailers equally in nearly every citation of pyramided prices. It is in the exercise of the middlemen *function*, no matter by whom performed, that these shady practices are found.

This report of the Coal Commission is not, however, wholly unfair to the wholesale coal trade, even though it smacks of the universal prejudice against middlemen. It had the facts from the books of the companies with respect to costs, income and profits. Its report is built around these bookkeeping facts. It finds that "even though the wholesaler normally operates at a fair margin and carries on an essential distribution service respecting a considerable part of the nation's tonnage, his speculative activities in times of shortage have been one of a number of causes of public unrest and dissatisfaction respecting the coal business." This is a backhanded way of saying, as is stated with respect to the retailer in the same report, that "In general the competitive nature of the retail trade makes regulation of margins and prices unnecessary except in cases of emergency shortage." This is equally true with regard to the wholesaler and the producer—and the consumer, although the Commission omits that reference.

Now, of course, the obvious thing to do is to attack the problem at its source—to eliminate the shortages—which is to say, cut out the large-scale strikes. But that is too simple in theory and too difficult in practice to intrigue the intellects of those who would reform coal. It is idle and even silly to level criticism at the Coal Commission for gathering and publishing facts or to condemn the collection of data in the report on the wholesale coal trade just because it discloses the indulgence by a few in unmoral tactics, the recital of which strikes a popular chord.

The coal trade may well consider in advance the effect on the incoming Congress of this angle of the Coal Commission's work fortified weekly by assaults from the Federal Trade Commission. Here is something that will appeal to demagogic congressmen and furnish inspiration and material for a flood or oratory, as it has already of press comment.



*Blocking a Car in Anthracite Breast**

Changes in Design of Mine Cars Made Necessary by the Substitution of Mechanical for Animal Haulage†

Rigid Trucks Reduce Derailments—Omitting Washer May Wreck Car—Should Brakes Be Provided?—Mis-shapen Cars Run Foul of Timbers—Should Make Car Irons of Wood Cars Excessively Heavy

By G. M. Gillette‡ and J. W. Reed§

SAFETY in mine-car construction and maintenance is such a broad subject and involves so much detail that in an article such as this it is possible only to call attention to those facts which seem to stand out most prominently.

The thickness of the seam of coal and the method of mining restrict the width and height of mine cars, and the size of the shaft limits their length. These dimensions enter materially into the safety of the car, but we cannot alter these conditions and must use the size which permits us to get out our coal most economically, accepting these restrictions as we do natural hazards such as bad roof.

The design of bumpers, couplings, running gear and body, however, are features which may be modified, and the safety of their construction, therefore, is open to discussion. The coal-mine car is, and has been for the past ten years, undergoing reconstruction in order to meet the new requirements of electrified mines. Undoubtedly many of our haulage accidents are traceable to the use of a car designed primarily for mule haulage which, with little or no change, has been pressed into service with gathering motors.

The new requirements are that the car be capable of being pushed ahead of the locomotive around sharp curves and be able to withstand more abuse and higher speeds than the mule-drawn car. Safety in present-day mine cars is largely a matter of mechanical strength. Their axles and wheels must above all remain rigid. A flimsy car or even one in which the wheels are merely out of line will cause many derailments.

Bolting Axles to Car Bottom Inadequate

The means of fastening the axles to the car body therefore is most important. The axles must not be merely bolted to the car bottom. It is necessary that they be reinforced and braced from axle to axle in order that they may be held rigidly in place, and it is better yet to fabricate or weld these braces and the axles into a truck of all-metal construction and then fasten this truck as whole to the car body and drawbar.

Lubrication is important, and roller bearings, grease or oil arrangements by which a constant supply of

*The headpiece shows method of blocking car by a post resting against a tie in the room track. This may not prove a sure anchorage and the prop may fall. Consequently a block is set on the rail and secured by a clevis, a chain leading from the clevis to the car hitching, to which it is attached by a hook. Should prop and block fail the chain would act. A small prop sprag has been placed under the front wheel.

†Article entitled "Safety in Underground Transportation in Coal Mines—Mine Cars," read before the National Safety Council at its Buffalo meeting, Oct. 4, 1923.

‡General manager, Consolidation Coal Co., Frostburg, Md.

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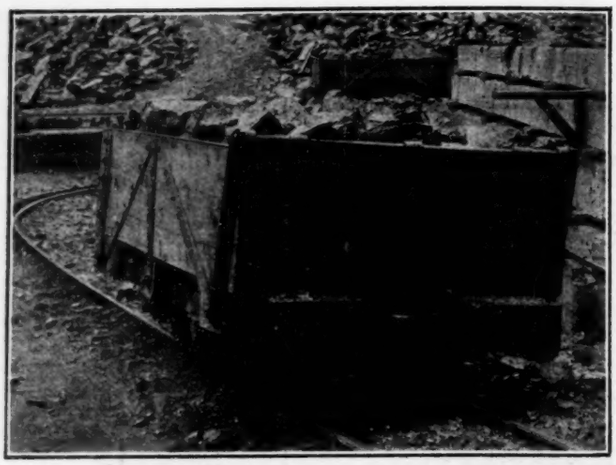


TWO-BUMPER ENDGATE CAR AT AN ANTHRACITE MINE

In the anthracite region, mules and short locomotive trips are still not uncommon. Conditions in many anthracite mines do not favor the storage-battery locomotive and the long trips that are so general in bituminous-coal mines. Consequently the double bumper and endgate have not found so much opposition from mining engineers in the hard-coal region as in soft-coal districts.

lubrication is furnished the wheel, decrease the wear on the axle and hub and help to prevent the wheels from becoming wobbly. But of even more importance than lubrication is that the wheel be so designed that the hub and axle shall wear evenly. The weight of the car must rest squarely upon the hub bearing. When it fails to do this, the hub will quickly wear conical, causing the wheel to become wobbly. To produce an even wearing of the hub and axle the center of the line where the tread rides the rail must be very nearly under the center of the hub bearing.

In service the wheels always must remain securely fastened to the axle. A washer and cotter key through the end of the axle probably is the oldest and the most common form of fastening. The use of this washer is obligatory as it prevents excessive wear of the cotter key, but unfortunately it frequently is omitted when the old wheels of a car are replaced. Any wheel in which the device by which it is fastened to the axle is not protected against excessive wear is dangerous and one that will be found loose on the axle most of the time. This defect is not confined to the old-style "oil-it-every-trip" wheel, for some roller-bearing and grease-packed wheels have this defect. Many a serious wreck can be traced to such loose wheels, whereas had the wheels been securely fastened the derailments would have been so trifling that the cars could be replaced in a few minutes.

Brakes sometimes are omitted, sprags being used to hold cars on steep gradients. This undoubtedly introduces an extra hazard, and we are disposed to believe that brakes are a necessity in all mines both for safety and efficiency. In a single coal mine brakes of many different designs are commonly found in use. Much might be said for and against almost all of them. The important requirement is that when they are in the off position they must release fully so as not to drag on the wheels and when applied they must put sufficient friction upon the wheels to retard, stop or hold the cars on the grades encountered or as the necessity of the haulage system requires.

Within certain limits the simpler forms of brake riggings are more dependable as they are more easily kept in repair. Of course the brake must be of sturdy construction and to operate satisfactorily it must have provision for taking up the wear of the band or of the shoes by which the pressure is applied.

With compound-lever action the play in the bearings between the movable parts must be carefully regulated. A little too much play in each bearing means much lost motion when the movement finally reaches the brake shoe, and many otherwise well-designed brakes have failed entirely on account of poorly made bearings. If you are having trouble with your form of brake, study carefully the bearings between movable parts. A more serviceable bearing probably will eliminate most of the trouble. Loose bearings are one of the most common causes of dragging brakes, and of course a brake which always rubs on the wheels usually is worn out and useless when needed.

On light grades the two-wheel brake meets with all the requirements of safety, but on heavy grades the four-wheel brake is almost a necessity.

For safety the brake should be applied either by pulling up or back on a side brake and away from the center of the car with an end brake. All brakes must be operated from the same side, which must be that opposite the trolley wire—that is, on the clearance side of the roadway.

The handle or device for operating the endgate latch should either operate automatically as the car is dumped or else be placed within convenient reach of the man standing alongside the car. To locate it so that the man must step on the front bumper to unlatch the endgate is dangerous.

Car with Endgate Is Structurally Weak

Both the swing and lift endgate type of car cause one entire end of the wagon to be left structurally weak and without side support. Only with difficulty is a car of this kind designed with the required rigidity, and it is not easy to construct one that will keep its shape reasonably well after some years of service. The increasing use of rotary dumps, by removing the need for a swinging or lifting endgate, is overcoming this defect and permitting of a much more substantial type of car.

Where the roof is unusually dangerous and where, accordingly, it is necessary to timber close to the track a crooked car is a menace, for the side of the wagon may strike and dislodge such timbers, greatly increasing the dangers of haulage. Anything that makes possible the use of a more rigid car is a step forward in safety. For this reason I look upon the rotary dump or any dumping system which eliminates the endgate as a safety provision.

Car irons, drawbars and the iron ribs of wooden cars must be designed with more than the strength desired for the car when new, it being customary as soon as the wood portions wear out to rebuild the irons into a new car and to continue doing so during the life of the mine, so that the irons in the car usually have the life of a number of mine cars. The rusting and corrosion during the length of service expected of car irons should be taken into consideration in the original design of the car.

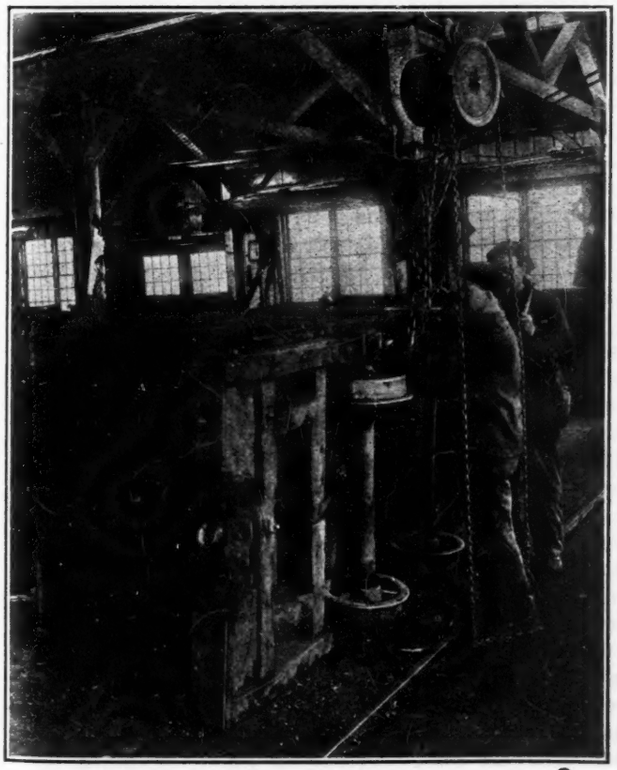
The design of mine-car bumpers should be carefully considered if safety is to be attained. The old-style double bumper with a three- to five-link coupling was the natural outcome of years of experimenting in producing a car suitable for mule haulage. It is a good car for that purpose, but with the electrification of the mines and the introduction of gathering locomotives

this type of bumper became unsafe and the cause of numerous accidents. The single and round bumpers designed so that cars may be pushed ahead of gathering locomotives, though they overcome some of the objectionable features of the double bumper, introduce several new hazards which require careful consideration.

Prominent among these hazards with some kinds of round bumpers is the closeness with which the edges of the cars approach each other on curves. When side brakes are provided the brake handle should not protrude past the end of the car. End brakes cannot be applied or loosened from the inside of curves nor can a car with end brakes be coupled safely from that position.

The bumper must be large enough to furnish a good footing for the brakeman riding the rear end of the trip and must hold the cars far enough apart to prevent injury when coupling cars on straight track. The bumpers must be deep enough to prevent them from riding over one another when the cars strike together.

The hole for the removable pin must be made larger through the bumper than through the draw bar so that objects passing through the latter will fall on through and not obstruct the hole. The coupling link should have room back of the fixed pin so that it can slide back clear of the edge of the bumper when cars come together. When two cars are bumper to bumper, 4 or 5 in. of room should be provided between the tops of the clevises holding the link, in order to prevent serious injuries to hands when coupling. The removable pin must be fastened to the car by a chain and should have a wide flange just below the hand hold to prevent the hand of the man making the coupling from being pinched between the pin and the end of the car. The hole for this pin should not be far from the end of the car body.



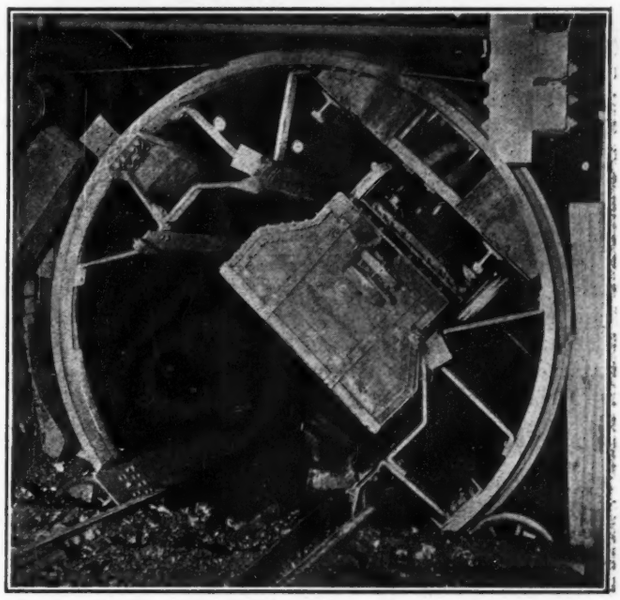
TIPPING OVER A MINE CAR IN SHOP

More attention has been paid lately to the stiffness of the truck. Unless the truck keeps its shape the car will not be safe nor indeed run easily.

Much vertical play must be allowed between the link and clevis or when the cars are pushed together the link will bear down upon the end of the next car and raise it off the track at low joints.

As cars vary in capacity from 1,000 lb. to 5 tons or even more, their strength must be calculated for their individual needs. However, within practical limits, if the various parts of the car are made heavier than apparently is required by the strength-of-materials formula, you will have a car more easy to keep in repair, and that means a safer car, for more accidents occur from faulty upkeep than from faulty design.

The following criticism has been made of the statement in this article, "I am disposed to believe that brakes are a necessity in all mines both for safety and efficiency":



CAR BEING OVERTURNED IN ROTARY DUMP

This car has merely a center bumper. Among other advantages of the rotary dump is the fact that with it a car can be made which will keep its shape and not sag down onto the wheels and get out of line, raking props and other timbers and making brakes, where provided, ineffective.

"There is a strong tendency now to do away with brakes entirely. With electric haulage and large cars, a car is not supposed to move unless a locomotive is attached to it. In consequence, unless the grades are excessive, the locomotive can apply all the brake power necessary. Most accidents occur by depending on brakes. Frequently these are out of order and a runaway occurs. Better to have no brakes and not depend on them than have brakes that are not dependable."

In replying to this criticism we feel that this is a fact, but we would not recommend dispensing with the brakes at all times. It is most difficult to arrange mechanical haulage so as always to move the car with the locomotive. Though such a manner of operation is possible yet we do not believe it will ever "work out" in the usual system of coal mining.

What is said by this critic about bad brakes also is true, but is this not a question of upkeep, for which the management is responsible? It does not seem that we should abandon the use of a necessary part of the car equipment because its upkeep is likely to be neglected. Should we not aim at eliminating such defects as prevent the brakes from being maintained in proper working order?

Suggestions as to the Construction and Location of Mine Gathering Pumps*

PUMPS for development work should be located in a place temporarily provided as near as possible to the place where the water accumulates but so far away from the haulage roads and working places as not to interfere with mining operations.

For development work, piston and plunger pumps generally are used. For ease in handling, they should be mounted on trucks or skids. They should have a capacity of from twenty to one hundred gallons per minute at 125 ft. total dynamic head.

Where quantities of water in excess of one hundred gallons per minute are to be handled, rotary and centrifugal pumps are used to some extent, and if the volume of water is fairly constant and does not contain too much acid these pumps prove very satisfactory. (This recommendation is noted as being contrary to the consensus of opinion of the convention at Pittsburgh.)

The discharge pipe should be of sufficient capacity that the total dynamic head will not require the pump to exceed its rated capacity. Where small quantities of water are to be handled it is not feasible to use pipe that will resist the corrosive action of acid water. Where larger quantities of water are pumped and the water contains much corrosive acid, it is advisable to use wood or other acid-resisting pipe.

Keep Acid Water from Exterior of Pipe

Care should be taken to keep the pipe blocked up from the bottom of the heading or pump chamber so that no acid water or moisture can come in contact with the outside of the pipe. The loss of head due to friction should be taken from the tables in the Hydraulic Society's Report of 1922, pages 16, 17, 18 and 19.

Pump installations for development work are of a temporary character, and they should be installed with that fact in view. The pumps should be so located that they are easily accessible for oiling and repairing and so that the attendant can move about the pumps freely without coming in contact with any of their moving parts.

Large sump capacity cannot usually be provided in practice, but sufficient space for water storage should be obtained so as to keep the pump in as nearly constant operation as possible. The motors for development pumps should be specially built for this class of service, as the standard motor does not give satisfactory results under ordinary pumping conditions. Where direct current is used compound motors should be installed. They usually should receive their power direct from the haulage circuit. Where alternating current is available the ordinary squirrel-cage induction motor proves very satisfactory.

Controllers should be moisture-proof and enclosed, whether they are manually or automatically operated. All coils and resistance should be so constructed as to resist the moisture contained in the mine atmosphere.

All motor windings, including the armature and field coils, should be thoroughly treated with a compound that will resist the action of the acid in the mine water. Special attention should be given to see that the field coils are entirely saturated with moisture-proof insulated material.

For gathering work, pumps should be selected which will start without priming and will pump air and water alternately in case the suction pipe is not at all times submerged. Pumps should be so constructed that they can be lubricated without excessive waste of oil. In all cases they should be fully equipped with grease or oil cups, whichever is best suited for the bearings. They should be so constructed that the acid water leaking from the packing glands cannot get into any of the bearing surfaces.

Valves should be so constructed that small chunks of coal and any other solid matter such as are constantly being washed into the sumps will go through them without clogging. Valves should be readily accessible for cleaning in case they become clogged.

Plungers Should Not Corrode, Score and Wear

The plungers of plunger pumps should be constructed of material that will resist the corrosive action of the acid in the water and will not be scored or worn excessively by the packing. The working barrel or liner of piston pumps should be constructed of material that will resist the corrosive action of the acid water and the wear of the packing in the piston.

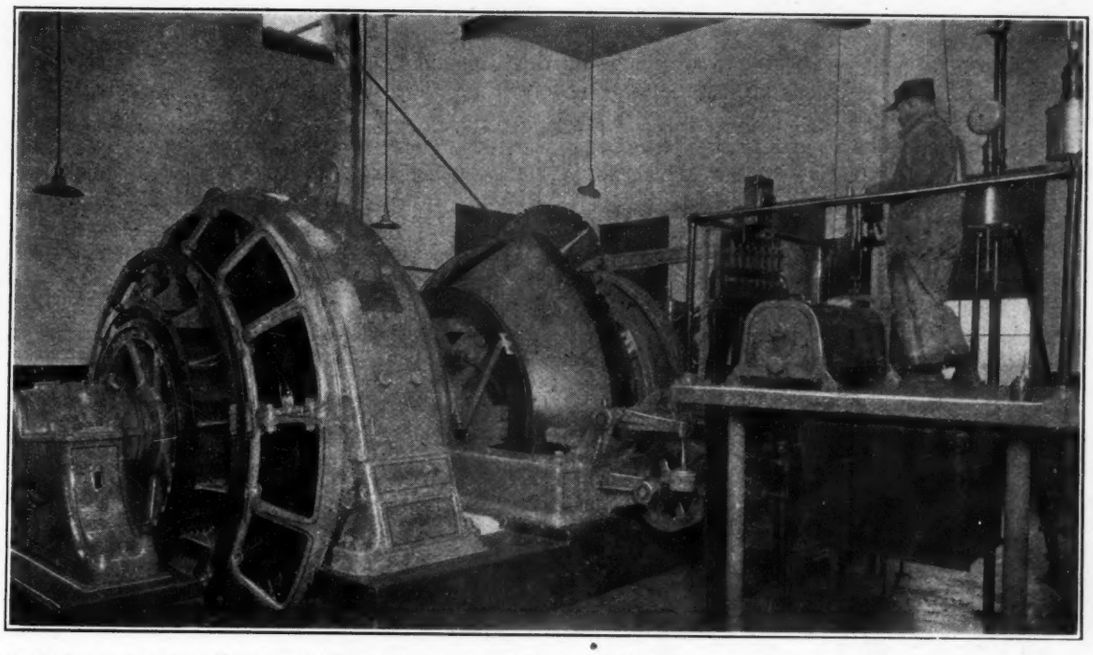
All the pumps for this class of work now on the market could be much improved. The upkeep on the types of pumps used today is entirely too high, and to that end some radical changes should be made.

In the past year pumps of the self-priming centrifugal type have been constructed and placed in service. These pumps have not been running long enough for their true merits to be determined, but there are indications that under certain conditions they will give better service than either piston or plunger pumps.

It has been recommended that complete detailed specifications be prepared for both piston and plunger pumps. I am much opposed to this as it would be a physical impossibility to write a specification that would not conflict in any way with some of the builders of development pumps. Later on, when we can get a little better co-operation between the manufacturers of this type of pump, would be a better time to give detailed specifications.

*Abstract of report of Subcommittee No. 1 on "Pumps for Development Work" of Committee on Mine Drainage of Standardization Division of American Mining Congress; L. S. Householder, electrical engineer, Rochester & Pittsburgh Coal & Iron Co., Indiana, Pa., chairman.

Results of Tests of a power plant at Rivermines, Mo., using pulverized coal as a fuel, are given in Technical Paper 316, just issued by the U. S. Bureau of Mines. Two boiler tests, six drier tests and eight mill tests were made by the fuel section of the Bureau of Mines, in co-operation with certain engineering firms. The boiler tests were made on two Stirling boilers, each having 7,688 sq.ft. of heating surface, the coal used being weighed as delivered to the preparation plant and before being pulverized. As the coal was passing through this plant, tests also were made of the drying and pulverizing units for the main object of determining the capacity of these units and the power they consumed. During each of the drier and mill tests 100 to 300 tons of coal was dried or pulverized. Bituminous coal from southern Illinois, of good quality for that district, was used. It was shipped as screenings, and the part delivered to the powdered-coal plant contained little slack. The results of the boiler tests are very good when compared with stoker performance under similar conditions.



Peabody Coal Co.'s 1,050-HP. Hoist at Mine No. 9, Calloway, Ill.

Mine-Hoist Control Equipment for Large Installations

Advantages of the Ilgner-Ward-Leonard System—High Efficiency Hoisting—Automatic Control Features—Auxiliary Hoisting Motors for Men and Repairs

By H. W. Chadbourne
Power and Mining Engineering Department, General Electric Co.

UNDER certain conditions the Ilgner-Ward-Leonard system of control for large mine hoists has inherent advantages over the induction motor or direct-current motor when operated directly from a constant potential. The principal advantages of this system are that a constant amount of power is taken from the line, and it is possible to get automatic control or a system of control which will respond to many different conditions of load, speed and length of hoist. For short, fast hoisting cycles, this type of equipment also has greater efficiency than can be obtained with other systems of control commonly used on small hoists.

That engineers of both coal and metal mines are realizing more and more the advantages of the Ilgner-Ward-Leonard system is attested by the fact that in eight months the General Electric Co. has received orders for twelve such equipments in sizes varying from 475 hp. to 2,200 hp. capacity. The total horsepower of the hoist motors equals 16,650, all on a 40-deg. C. rise continuous rated basis. Ten equipments were for coal mines and two for metal mines.

Of these twelve equipments, three have drum control and nine have the magnetic type. With magnetic control the strength and direction of the generator field are controlled by a small master switch which carries the contactor control current only, while contactors handle the field current. This control has been arranged to obtain different results, depending upon requirements. There are a number of advantages of magnetic control over drum type control, either hand or motor operated. First, the master switch is small and the manual effort required from the operator is slight. This is an important item on fast cycles. Second, magnetic control can be arranged very simply to give current limit acceleration if desired—that is, the operator may throw the

FIG. 1—GENERAL VIEW OF SEMI-AUTOMATIC HOIST EQUIPMENT

This hoist is one of the Valier Coal Co., Valier, Ill. On the left is the flywheel motor generator set.

master switch to the full running position and the hoist motor will properly accelerate with the current never exceeding a predetermined value. The current output of the generator is thus kept below an amperage well within its commutating limits.

Ordinarily this control is not connected to give current limit retardation. Should conditions warrant, however, this feature can readily be included. The contactors are so connected that they drop out in sequence, thus giving some time delay. This allows the motor to act as a generator and assist in bringing the load to rest.

Unusual Control Features for Special Results

Unusual features introduced in the control to obtain certain results have been embodied in recent installations, two hoists for the Inspiration Copper Co. being good examples of these innovations. The supply hoist equipment has a motor rated for 600 hp. at 400 r.p.m., with a flywheel set having a 450-kw. generator, a 500-hp. induction motor and a 16,500-lb. flywheel. This equipment has a master switch giving 15 points for automatic acceleration, all of which may be hand controlled. The master switch is located in the hoist house as usual, but the signals for hoisting are given by a man who at times rides the cage and at times signals from the different levels. As a safety precaution an arrangement is made so that it is impossible to signal from any level unless the cage is at that level. This is accomplished by a device similar to a geared limit switch but with eleven contacts, one for each level. The equipment also is provided with an extra control switch for limiting the speed of man hoisting, by preventing the closing of the last field control contactors.

The main ore hoist for the Inspiration Copper Co. consists of a 2,150-hp. hoist motor of 51 r.p.m., a flywheel set consisting of a 1,600-kw. generator, a 1,900-hp. induction motor and a 78,000-lb. flywheel. The main hoist apparatus is located in the same room as the man hoist.

This controller has a motor-operated drum for controlling the generator field, a five-point selective switch mounted near the drum controller in the hoist house and a system of master switches, one in the hoist house and one at each of the three levels from which ore is to be hoisted. These master switches are in reality small one-point controllers which are under the control of the operator. The direction of hoisting is controlled by two geared limit switches in the hoist house which operate alternately.

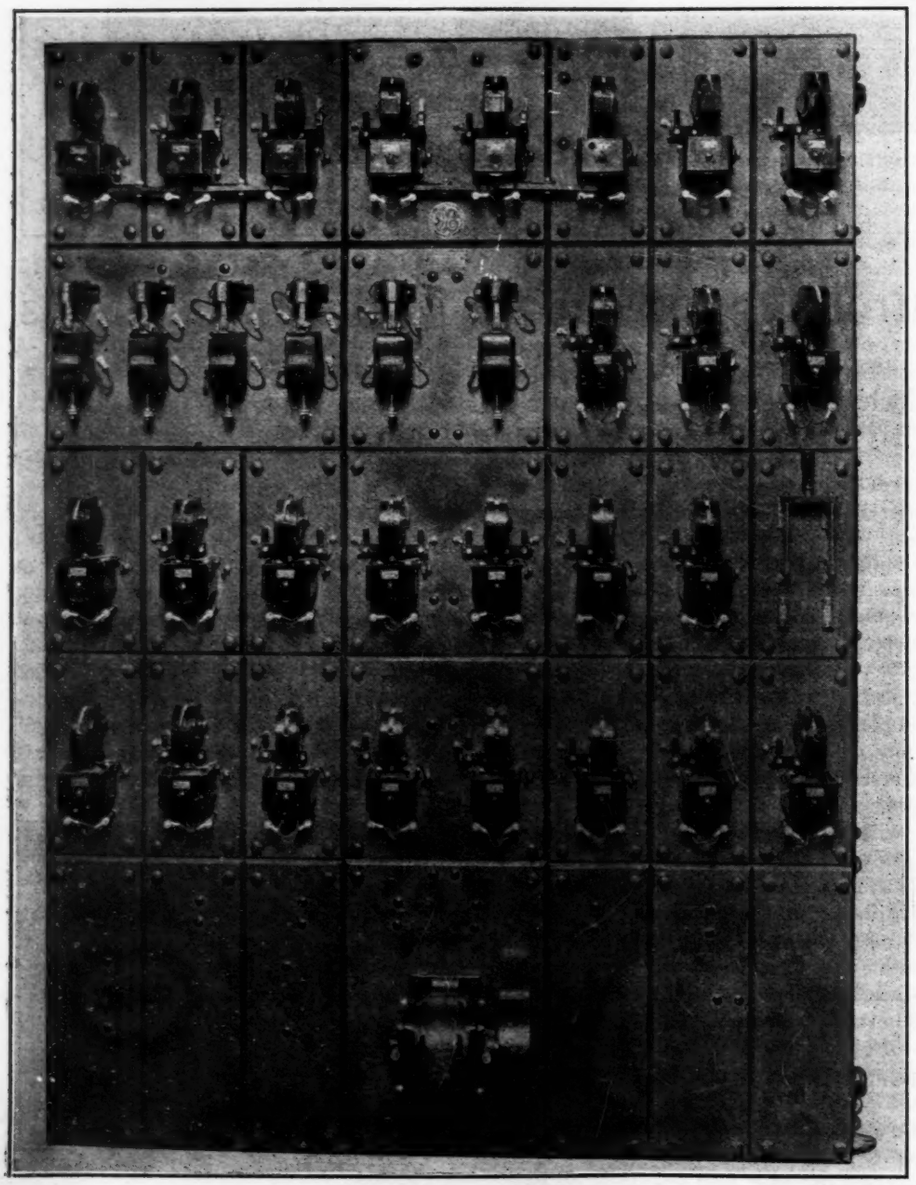


FIG. 2—CONTROL PANEL

Uniformity of arrangement of equipment greatly simplifies the design and maintenance of the hoist control equipment.

The operator sets the selective switch for the correct level and reclutches the drum, after which the man at the level operates the hoist from that level. It also is possible to operate the main hoist manually from the hoist house.

In order to get variable rates of retardation a cam turn-off device is used which is automatic, the cam turning the drum controller toward the off position at the correct rate to obtain the retardation required. In this case it is necessary to retard at three different rates, besides having a short interval at constant speed. Therefore it becomes advisable to use a cam turn-off device. If an attempt were made to duplicate this condition of retardation with current limit relays it would mean very complicated equipment.

The two equipments also are supplied with a switching arrangement so that the man-hoist motor can be operated from the main generator in case of emergency.

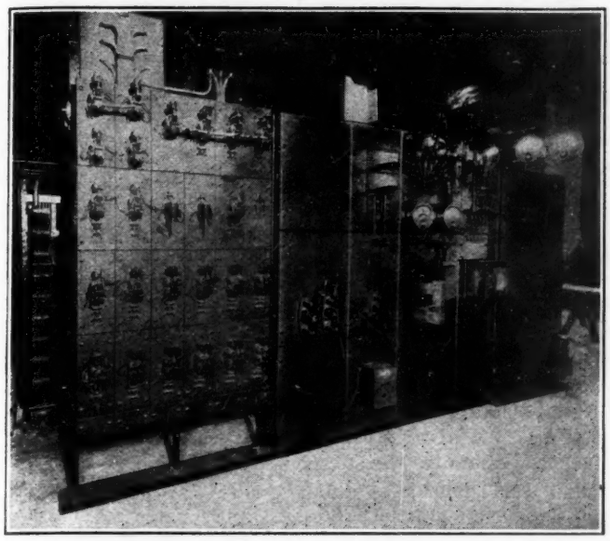


FIG. 3—MAGNETIC CONTROL AND SWITCHBOARD PANELS

The switchboard panels are equipped with the usual protective devices. The magnetic control panel shows the control contactors. Illustration shows 1,400-hp. hoist at plant of Homestake Mining Co., Lead, N. D.

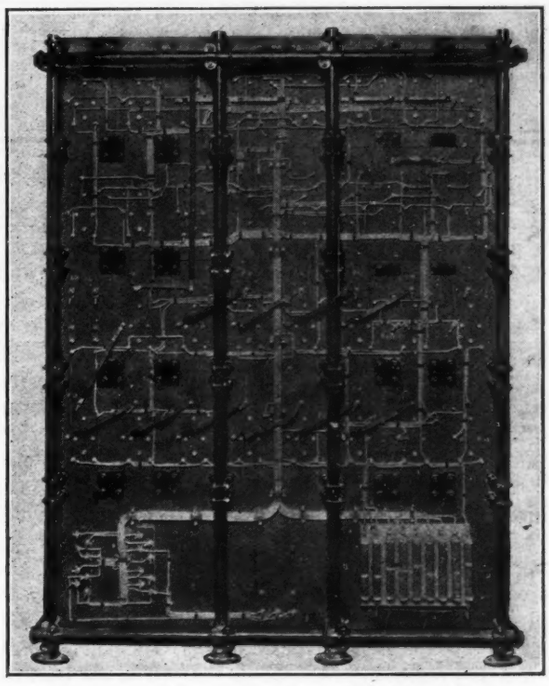


FIG. 4—REAR VIEW OF CONTROL PANEL

The wiring arrangement shows how each part is related to the other. This is the rear of the panel shown in Fig. 2.

One unusual feature of the five equipments ordered by the Old Ben Coal Corporation is that each hoist is equipped with an auxiliary induction motor geared to the opposite end of the drum shaft from the main motor. This auxiliary motor is for use at night and idle periods and operates the drum at a much reduced speed. The hoist builder has interlocked his part of the equipment so that it is not possible to operate the main motor with the induction motor gears in mesh. The control circuits are so interlocked that the auxiliary induction motor cannot be operated when the induction motor of the flywheel set is on the line, or vice versa. Therefore, both equipments—the main hoist motor and the auxiliary hoist motor—cannot be operated at the same time. All of these main motors are also equipped with transfer switches in the control to limit the speed when hoisting men and also to light signal lamps so that the men will know that the control is in the man-hoisting position.

It might be of interest to note some of the work done by such large equipments. The 2,200-hp. motors for the Old Ben Coal Corporation each hoist 8,400 lb. of coal per trip, a distance of about 500 ft. (the distance varies from 484 ft. at one mine to 519 ft. at another), making a trip in 18-seconds, or 200 trips per hour. This gives 840 tons per hour for each hoist, or about 6,000 tons per day of seven hours. The Inspiration Copper Co.'s 2,150-hp. motor hoists 24,000 lb., or 12 tons, of ore per trip. The lift from the bottom level is 1,485 ft. This takes 69.3 seconds per trip, or 625 tons per hour, which is 4,400 tons for a seven-hour day.

Physically the 2,150-hp motor at 53 r.p.m. is the largest hoist motor in the United States. The three 2,200-hp. motors for the Old Ben Coal company, being at 110 r.p.m. are smaller mechanically. When ordered, these 2,200-hp. motors were the largest horsepower rated hoist motors in the United States either in metal or coal mines.

DETERMINATION OF FINENESS OF PULVERIZED COAL.—In conjunction with the committee on coal and coke of the American Society for Testing Materials, methods for making size tests of powdered coal, both by hand and machine sieving, have been formulated by W. A. Selvig, assistant analytical chemist, attached to the Pittsburgh experiment station of the U. S. Bureau of Mines, Department of the Interior, and sent to various co-operating laboratories for trial and criticism. This work will be continued with a view to formulating a satisfactory standard for making fineness tests of powdered coal.

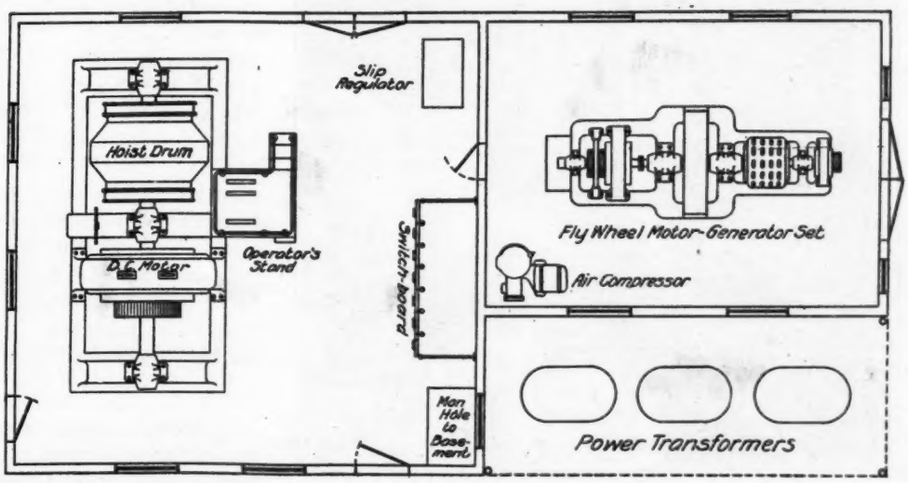


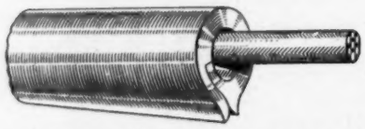
FIG. 5—LAYOUT FOR A COAL-MINE HOIST STATION

Here is a large capacity hoist using the Ilgner-Ward-Leonard system of control. The flywheel set is in a separate room, while the power transformers are located outside.

New Equipment

Safety in High-Voltage Line Work

RUBBER blankets have been used for many years to protect linemen from high-voltage current when making repairs. They are awkward to carry and to place. A simple protector for linemen is shown in the illustration. It is in the shape of a hose and has a sort of self-locking arrangement which gives it a firm hold on the wire. Yet it is readily applied and shifted into place along the conductor by pressure at one end. It also is quite easily removed. The lineman does not have to lean over far to apply, shift or remove the hose. It is made by W. H. Salisbury & Co., Inc. Of course it always is preferable to deaden the wires by the use of a switch, locked against reclosing, before attempting to do any work on them, but where this cannot be done the hose protection is available and highly effective.

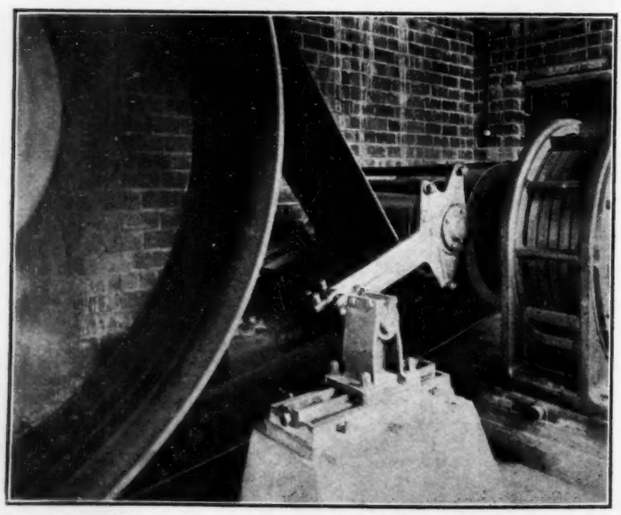


HOSE TO PROTECT LINEMAN
Used in place of a rubber blanket this self-locking hose keeps lineman from being electrocuted.

Device for Use on Belt Drives Having Short Pulley Centers

BELT drives always are popular among the mechanical men at the coal mines because of their flexibility and the ease with which the speed of a machine may be varied by changing one or both pulleys without a change in pulley centers.

The photograph shows the Lenix drive, made by F. L. Smidth & Co., of New York, applied to a 200-hp. fan. As will be noted in the picture, the pulley centers are extremely short yet the drive is made highly efficient by reason of the Lenix, which permits of the elimination of 75 per cent of the initial tension found in ordinary belt drives.



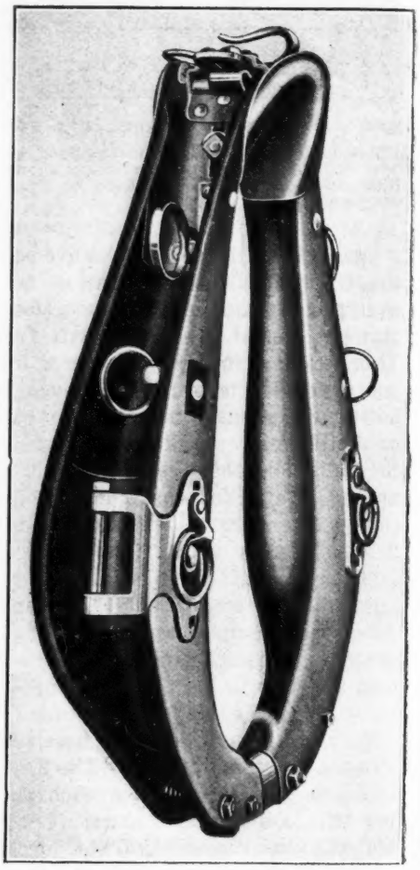
A LENIX APPLIED TO A FAN DRIVE
Where the pulley centers are short, the Lenix greatly increases the drive efficiency and at the same time decrease the belt tension.

The best conditions for Lenix drives are with high belt speed and short pulley centers. It also permits high pulley ratios with the use of high-speed motors, resulting in higher efficiencies.

This device is being recommended for mine fans and similar drives, especially where it is either necessary or desirable to have short belt centers.

Saving Mules from Galled Shoulders

ZINC oxide is a well-known antiseptic. On the other hand, leather is a germ breeder. It is surprising therefore that mule collars are still constructed with the rubbing surfaces of leather and not of zinc. Where their collars are made of zinc the shoulders and necks of horses or mules can be kept free from sores. An oxide of zinc forms on the collar and helps the sores to heal, if there are any in process of development. A collar of this kind, manufactured by the Thomson Co., of Fitchburg, Mass., is illustrated herewith. It is easily adjustable and so sweat bands, always unsanitary, which steam the necks, cause sores and are breeding places for germs, are unnecessary. These collars are much lighter than a leather collar for they weigh about 16 lb., whereas the usual collar with hames will weigh as much as 25 lb. Special springs absorb the shock when starting a load or when striking an obstruction. The collars are easy to keep clean as they can be sufficiently cleansed by wiping them with a kerosene cloth. This should be done invariably after using.



COLLAR THAT WILL KEEP THE MULE ON THE JOB
Most of the absenteeism of mules from the mines, apart from that due to lack of coal orders, results from sore shoulders and necks. A zinc collar is said to reduce such absenteeism.

This type of horse collar has been in use for more than thirty-five years. During this time it has been gradually improved. Recent changes in design provide for an easy and wide range of adjustments.

A RECENT ADDITION to the list of permissible electric cap lamps approved by the U. S. Bureau of Mines for use in gaseous and dusty coal mines is the Concordia lamp (type RM 6 o.d.), manufactured by the Concordia Electric Co., Pittsburgh, Pa.

How Mines Can Be Moistened Without Use of a Big Force Fan or Obstruction of Haulage Roads

By Using Disk Force Fan in a Subsidiary Intake Conditioned Air Is Delivered to Main Airway, the Ventilation of Which Is by Suction, the Air Being Motionless in Mine Portal

By Thomas Chester
American Blower Co., Detroit, Mich.

EVERY winter and spring explosions which unmistakably are due to dust occur in coal mines in greater or lesser degree, sometimes causing terrible disaster in which hundreds of men are killed and severe financial loss to the owner.

Normally a tremendous drying out occurs in mines in cold weather and according to a paper read recently to the employees of the Colorado Fuel & Iron Co. by James Dalrymple, chief inspector of coal mines for Colorado, it appears that in that state during the month of March there was an evaporation of 12,991 gallons, or approximately 54 tons, of water per 24 hours for each 100,000 cu.ft. of air circulated per minute. In January and February the evaporation is even greater, but no figures have been published for these months.

Local explosions of gas occur from time to time, but if the general percentage of methane in the mine air is well below the danger point and the coal dust is thoroughly wet, such an explosion will have a limited effect.

Any dry combustible material if in finely divided form can be exploded if suitably distributed in air. Experiments have been made as to the inflammability of about 150 different varieties of dusts produced in industrial work. In this way information has been obtained in regard to the flame temperatures and the pressures generated in pounds per square inch. That the coal is explosive because reduced to dust is shown by the fact that dust explosions occur in factories where fine dusts of combustible material are made as well as in coal mines, and much serious and expensive damage has been done in this way, some examples of wrecked buildings being flour mills, starch factories, chocolate plants, sugar refineries, aluminum factories, etc.

Why Fineness Causes Inflammability

A block of coal will not burn until the surface is raised to the ignition temperature, and the mass retards this rise in temperature by absorbing heat from the surface. Finely powdered dry coal will burn almost in the same manner as a gas and for this reason this material is now used in furnaces as a fuel.

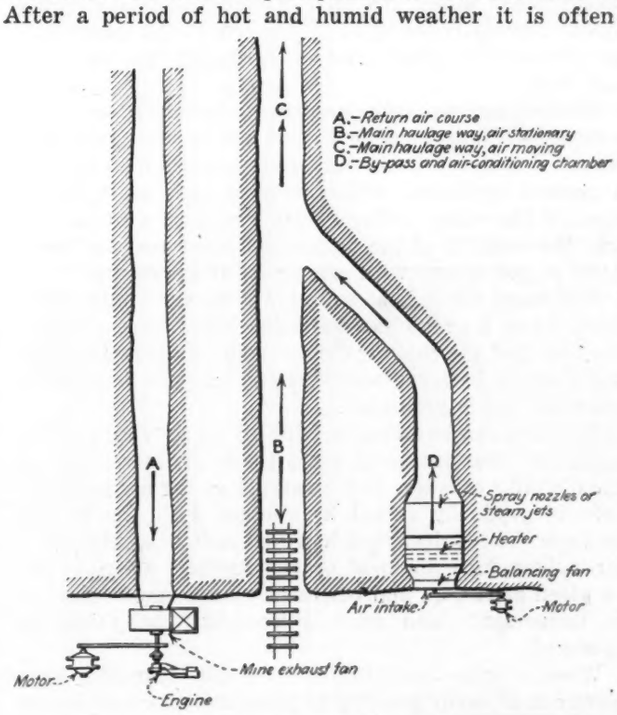
It will readily be seen, therefore, that the sprinkling of water in coal mines is of value because the dust particles thereby are made wet, and this moisture has to be converted into steam before gas can be distilled from the dust particles.

If this absorption of heat is great enough combustion will cease. The same result is achieved by spreading powdered limestone or other finely divided inert material throughout the mine. The substance used in this way absorbs heat and does not subsequently liberate any. Coal dust, on the contrary, absorbs heat at the outset, but upon being raised to the combustion temperature gives off heat in accordance with its calorific value.

It has been established that the more finely divided any combustible is the more rapidly it will burn, whether placed in a pile or distributed in a suitable manner in a current of air. Thus, for the purpose of slowing down the speed of ignition the explosive material used for large naval guns is agglomerated into comparatively large pieces. In this way the explosion is made less rapid. The principle involved is that the more finely divided any material is the much greater is the ratio between the exposed surface and the mass, and conversely the larger the particles the greater the ratio of mass to surface.

Consequently another advantage in wetting coal dust is that it causes the particles to cohere to a certain extent, with the result that the ratio between surface and mass is reduced. Also the increase in weight of the individual particles caused by this agglomeration and by the saturation with water reduces the ease with which dust can be blown into the air from the floor of an entry.

Serious mine explosions seldom occur in summer. This is because a comparatively large quantity of water vapor is present in the outside atmosphere. In passing through a mine this air is cooled below dewpoint, with the result that water is precipitated in the form of dew. After a period of hot and humid weather it is often



CONDITIONS AIR AND PASSES IT TO MAIN ENTRY

By means of a fan air is driven into the main entry beyond the portal at such speed as to satisfy the exhaust fan. Consequently the air between the portal and the point of entry of the conditioned air is stationary.

found that mines are wet to the face of the longest entry on account of this condensation.

The quantity of water vapor in a cubic foot of saturated space of air at various temperatures with normal barometric pressure is as indicated in Table I.

TABLE I—GRAINS OF WATER VAPOR IN CUBIC FOOT OF SATURATED AIR

Deg.	Grains	Deg.	Grains	Deg.	Grains
10	0.776	34	2.279	58	5.370
12	0.856	36	2.457	60	5.745
14	0.941	38	2.646	62	6.142
16	1.032	40	2.849	64	6.563
18	1.128	42	3.064	66	7.009
20	1.235	44	3.294	68	7.480
22	1.355	46	3.539	70	7.980
24	1.483	48	3.800	72	8.508
26	1.623	50	4.076	74	9.066
28	1.773	52	4.372	76	9.655
30	1.946	54	4.685	78	10.277
32	2.113	56	5.016	80	10.934

Air having a dry-bulb temperature of 95 deg. and a wet-bulb temperature of 77 deg. carries about 8 grains of moisture per cubic foot and has a relative humidity of about 47 per cent, which means that it is 47 per cent saturated.

If this air is cooled down to 70 deg. it will still carry about 8 grains of moisture per cubic foot, but then will be in an almost saturated condition or nearly at dew-point. If this air is cooled down to 60 deg. it will still be saturated, but will then carry 5.745 grains of moisture per cubic foot, as will be noted from the above table, and the quantity of water condensed out of the air will be 2.235 grains per cubic foot, and it is the deposition of this moisture which makes a mine wet in summer.

This action can be produced artificially in winter by heating the air to the required temperature and loading it with moisture before it goes into a mine. Usually it is not necessary, however, to actually deposit moisture in a mine during winter, as in most cases this action is produced naturally during summer and autumn; all that is necessary in winter is to prevent evaporation. This is done by raising the air temperature to permit of the absorption of water, and the moisture content is brought up as near as required to saturation at the mean temperature of the mine—that is to say, of the coal seam and roof.

Dust explosions can be produced by runaway cars, collisions, rock falls, blown-out shots and by local gas explosions. Any one of these can stir up enough dust to start a general explosion, which is intensified as it passes through the mine. After a dust explosion is well under way the velocity of the detonating wave reaches about 2,000 ft. per second with great heat and pressure.

If exhaust steam is blown into the air entering a mine, much water is precipitated and fog is produced owing to the fact that the cold air cannot take up the moisture in the form of invisible water vapor, but this is possible when the air is preheated.

Moisture can be added to mine air by providing water sprays at intervals which permit suitable increments in the quantity of water vapor carried as the air temperature is gradually raised by contact with the airway surface. The logical plan, however, is to concentrate the air-moistening equipment on the surface, where it can be given attention, and where any necessary variations in temperature and relative humidity easily can be produced.

When a mine is ventilated by a fan operating as a blower it is easily possible to place the air-conditioning apparatus between the fan and the intake drift or downcast shaft. When a mine is ventilated on the exhaust principle the condition is not quite so simple, as it is not desirable to use double doors or air locks to enable the intake air to be suitably conditioned, because this would interfere with taking out coal as rapidly as possible.

Martin J. Lide, consulting engineer of Birmingham, Ala., has developed and patented a system whereby this difficulty can be overcome satisfactorily. The Lide system consists of the use of a disk fan for blowing all the air which goes into a mine, through a bypass which enters the main haulage slope or shaft some distance within the portal or collar, as the case may be. A suitable area of heating surface is furnished for raising the air to the required temperature and either water-spray nozzles or steam jets are used to add moisture.

By using the bypass and disk fan the mouth of the slope or shaft is kept in a neutral condition as regards air movement and there is no interference with the haulage of coal. The inflowing air passes through the disk fan and air-conditioning apparatus and through the bypass to the mine. This will be clear from an inspection of the sketch herewith, which gives a plan of an installation of this character applied to a drift mine.

With the Lide system the air can be supersaturated when required, so that during shutdowns moisture can be deposited in the form of dew by the air used for ventilation. This is much better than sprinkling, because men who have to work in dark places cannot be sure that their work is well done. Moreover they are not always actuated by a desire to perform their work thoroughly.

This system can be best applied to mines which are equipped with power plants and have a large quantity of exhaust steam available, but operations which use purchased power can use low-pressure steam from a plant installed for this purpose. This need not be expensive, as second-hand boilers can be used for the low-pressure needed and waste coal can be burned by installing a forced-draft fan.

If evaporation is prevented in cold weather, as indicated, and if the rooms are sprinkled wherever coal-cutting machines are at work, it will be found possible greatly to reduce or wholly to eliminate dust explosions.

French Coal Imports and Exports in July

French imports and exports of coal and coke in July of this year and for the first seven months of the year were as follows, in metric tons:

	Imports		Exports	
	July	Jan.-July	July	Jan.-July
Coal				
Great Britain	1,624,400	10,649,400	.....	.....
Belgium	160,900	1,333,900	91,100	716,100
Saar	372,500	1,222,500	17,600	178,600
Germany	73,600	749,600	1,900	41,900
United States	154,600	452,600	.....	.....
Holland	70,100	378,100	.....	.....
Switzerland	.....	.....	42,300	209.300
Italy	.....	.....	6,400	65,400
Other Countries	.....	.....	.....	.....
Totals	2,472,400	14,825,400	176,700	1,374,700
Coke				
Germany	152,700	927,700	.....	1,600
Great Britain	15,200	333,400	.....	.....
Belgium	47,100	267,100	2,300	5,300
Holland	37,500	213,500	.....	.....
United States	44,100	164,900	.....	.....
Saar	5,300	65,900	.....	3,900
Czecho Slovakia	.....	28,300	.....	.....
Switzerland	.....	.....	15,600	59,600
Italy	.....	.....	19,600	143,600
Other Countries	.....	.....	.....	.....
Totals	301,900	2,001,900	40,700	230,700
Patent Fuel				
Belgium	37,500	234,500	.....	6,200
Germany	12,900	111,900	.....	5,100
Great Britain	19,800	101,800	.....	.....
Holland	.....	10,600	.....	.....
Switzerland	.....	.....	9,300	93,300
Algeria	.....	.....	.....	9,100
Italy	.....	.....	700	7,700
Totals	72,200	460,200	12,800	147,80 0

Group Insurance as an Aid to Reducing Mine Accidents

Safety Engineering Department of Large Insurance Company Makes Recommendations—Analysis Covering Fifteen Months Indicates Possible Reduction of 75 per Cent—Employee Safety Organization Highly Effective

By Thomas A. Walsh
Safety Engineer

SERVICE is more than delivering satisfactorily that which has been sold. It is more than commercial cleverness. Service is the secret of success. President Coolidge has said: "The business of the country depends upon private initiative. It depends upon good-will and a desire to serve more than ruinous competition and a desire for gain."

In a recent article in *Coal Age** the possibilities of a better understanding between employer and employee through group insurance was pointed out. Attention was drawn to the number of coal companies that had adopted group insurance as a means of establishing better relations between themselves and their workers. It is recognized that a sincere and an active interest in the physical safety of the men on the part of the employer is another approach toward cementing the tie between them.

Realizing this fact, one of the large insurance companies has established a service bureau which, among other services, has a safety engineering department. As one of the safety engineers of this bureau, I recently visited a group of mines that had purchased group insurance and were anxious to have me make a survey and supply them with recommendations for reducing accidents among their workmen. After spending several weeks making careful investigations of this company's operations, covering eight camps and fifteen mines, a report on the conditions found, which included recommendations for accident prevention, was prepared. This article is based on that report.

Analysis Reveals Heavy Loss in Output and Expense.—Preliminary to the survey, an analysis was made of 575 accidents involving a loss of time of one day or more, in all the mines for a period of fifteen months. This analysis showed that because of accidents and on the basis of weighting as established by the International Board of Accident Commissions, there were 110,000 days lost in this fifteen months' period, with a coal production loss of 495,000 tons and an accident cost of approximately $50,000, totaling an operating loss of approximately $1,040,000.

As indicated by Fig. 1, 40 per cent of these accidents involved miners and 35 per cent transportation men as follows: brakemen, 20 per cent; trackmen, 10 per cent, and motormen, 5 per cent. Miners and transportation men sustained 75 per cent of all accidents for the period. These accidents were responsible for 86 per cent of the total tonnage loss due to accidents, as shown in Fig. 2. The remaining 25 per cent of the total accidents reviewed affected machine men, timbermen and others in varying percentages from 5 to 1. Fig. 3 indicates that 36 per cent of all accidents are attributed directly to slate and coal falls; 15 per cent occurred in transporting material and equipment and 11 per cent in handling material in the course of producing coal. The remaining cause classifications in Fig. 3 are of varying importance, with a maximum of 17 per cent for all other causes to 1 per cent for nail punctures and explosions.

A study of this cause chart indicates that a possible reduction of 75 per cent of all causes can be looked for, with an immediate reduction of 50 per cent in the classification of slate and coal falls alone. There also are presented diagrams of accident severity and frequency rates, computed on a monthly basis and comparing the ratio of accidents and days lost due to these accidents per 100 men for eight camps. The annual average monthly accident rate is 1.2 per 100 employees for all mines, and the severity rate is thirty days per 100 men employed. The fatality rate is 3.5 per 1,000 employees.

Causes of Accidents.—The company is doing everything practicable to eliminate accidents from a physical point of view. Physical conditions of the properties, both on the surface and underground, are good. These conditions are maintained through the efforts of a competent mine inspector. His work is largely that of inspecting the various mines from the point of physical safety. He has the fullest co-operation of all officials, from the general manager down to assistant mine foremen. But physical conditions involve probably only 10 per cent of those factors which when corrected tend toward accident elimination.

A study of the diagrams indicates that accidents

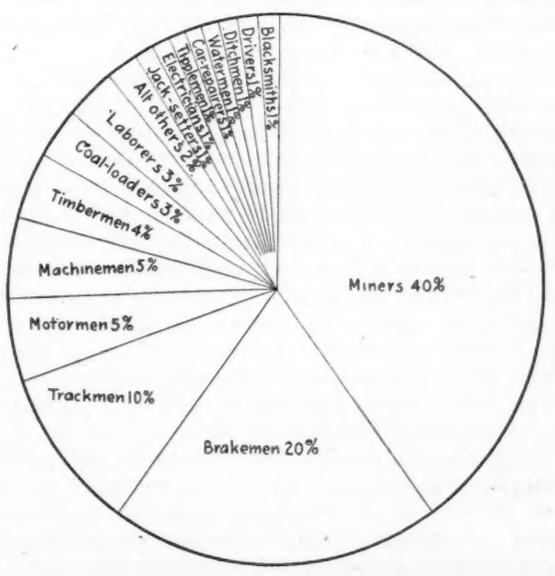


FIG. 1—DISTRIBUTION OF ACCIDENTS BY OCCUPATIONS
This diagram shows that more miners meet with accidents than men in any other work around the coal mines. It appears, however, that the accident rate is higher among brakemen since there are many miners to each brakeman employed.

*"Group Insurance: What It Is and Its Advantages to Employer and Employee," by R. W. Sparks; Aug. 16, 1923.

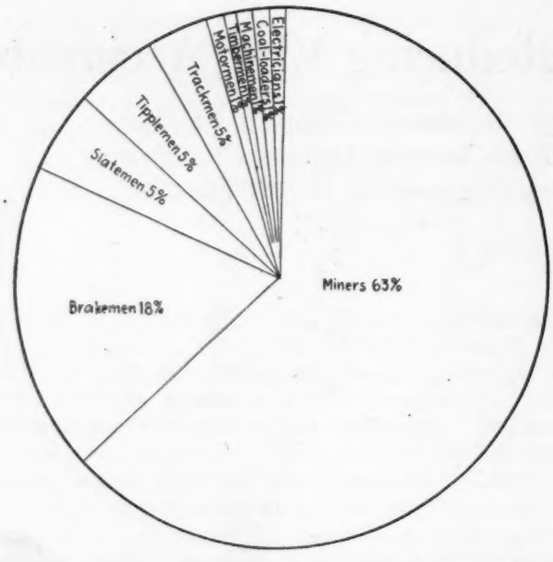


FIG. 2—ACCIDENTS AS A CAUSE OF LOST PRODUCTION
According to the analysis of accidents at these fifteen mines, accidents to miners cause the largest loss in production, with brakemen second. That accidents to brakemen figure so largely is evidence of the importance of transportation in getting coal to the tipple.

involving the negligence of the personnel compose a greater proportion of the total than those attributed to defective structural conditions of the property, either on the surface or underground. To effectively reduce this present high accident rate, which is largely due to individual carelessness, it was suggested that a safety organization be developed, including formation of safety committees, holding of meetings, carrying on of efficient educational work in accident prevention through the use of bulletin boards, pay envelopes, etc., and the investigation of all accidents involving loss of time.

The plan proposed should easily be launched and maintained, due to the exceedingly good feeling existing between employees and this employer and because of the favorable attitude of the general manager and the mine officials generally. Under such favorable circumstances, measurable results from the efficient operation of the plan should be quickly realized.

Where accident-prevention work is made part of the operating practice of the industry and is administered through efficient methods, effective results as indicated are obtained. As an indication of what can be done the following notes from records available to the writer are suggested. The A Coal Co. recently, during a period of approximately one year, has reduced the number of lost time accidents 51 per cent and in the same period reduced the number of days lost due to such accidents 85 per cent. The hours worked increased 2 per cent. The tonnage mined per day increased 11.2 per cent. There was a 68 per cent reduction in accident cost per ton of coal mines accompanied by a 72 per cent decrease in accident cost per $100 of payroll.

The B Coal Corporation passed through 1919 without a single fatal accident and with a reduction of more than 70 per cent in non-fatal accidents for the same period. Compared with a previous year's record of 2,212 non-fatal accidents, the record for 1919 was 1,717 non-fatal accidents.

The C Coal Co. reports that it has reduced its fatality frequency rate from 1 for every 84,972 eight-hour shifts worked during the period from 1913 to 1916 to an average of 1 for every 400,727 eight-hour shifts worked during the years from 1917 to 1920. From Jan. 15, 1918, to Aug. 2, 1920, this company operated 763,000 eight-hour shifts without a single fatality.

The D Coke Co. reports that it reduced its rate during 1920 to 1.71 deaths per million tons produced. The E Coal Co., of West Virginia, reduced its accidents 18 per cent in 1920 from 1919. It has reduced fatalities 33 per cent, while at the same time increasing output.

The F Steel Corporation since 1906 has reduced serious and fatal accidents 56.13 per cent and further reports that since 1912 accidents causing a loss of time greater than the working day have been reduced 71.41 per cent.

In all of the foregoing instances the personal factor of the operation has been considered as the governing one in the reduction of accidents. Accidents can be reduced only through the combined efforts of all concerned. For this particular company the following program of accident-prevention work in its various camps was designed and recommended:

Plan for Safety Organization.—Central safety, mine safety and, where feasible, sectional committees should be organized.

The Central Safety Committee should be made up of the general manager as chairman, safety engineer, general superintendent, chief engineer, maintenance engineer, claim man, and superintendents of the various mines.

The Mine Safety Committee should consist of the mine superintendent as chairman, the safety engineer as secretary, the mine foreman, assistant mine foreman, mine electrician and workmen. The assistant mine foreman and the workmen to be rotated.

The following schedule of items is suggested for the consideration of the committees at their meetings:

Central Safety Committee

(1) Review abstract of minutes of mine-safety committees.

(2) Review all mine accidents occurring during previous month.

(3) Receive recommendations for the prevention of such accidents.

(4) Receive review of recommendations submitted by the mine committees to this body with the idea of making them standard practices, wherever possible.

(5) Consider accidents on a basis of loss in production and insurance cost.

(6) Assist in the development of general operating rules.

(7) Every two months appoint a special committee to make a survey of at least one mine with the idea of promoting better safety conditions in the particular mine visited. A detailed report of this inspection should be submitted, with recommendations, to the Central Safety Committee.

(8) Keep in touch, as far as practicable, with all new safety devices or methods developed for the prevention of accidents in their particular industry.

Mine Safety Committees

(1) Report and review all accidents occurring in the particular mine.

(2) Consider suggestions and recommendations submitted by members and others regarding accident-prevention methods, sanitation and welfare.

(3) Submit for approval to the Central Safety Committee such recommendations as should become part of the company's standard practice.

(4) Initiate and arrange for the carrying on of educational work in accident prevention among employees of the mine concerned.

The Court of Inquiry should be a special committee,

appointed as accidents occur, by the chairman of the Mine Safety Committee to investigate the serious accidents and fatalities. The organization of the Court of Inquiry would comprise the mine superintendent as chairman, the camp doctor, the safety engineer, the foreman in charge of the employee who was injured or killed, and witnesses to the accident. The duties of this Court of Inquiry would be to determine the cause and the responsibility for the accident. A questionnaire compiled along the following lines may serve as a guide to this committee:

(1) Date of the accident.
(2) Doctor's statement as to physical condition of injured when visited by him.
(3) Foreman's and assistant foreman's report of the accident.
(4) Witnesses' reports of the accident, supplemented by photographs, drawings or other data relating to the physical conditions of the plant or machine where the accident occurred.
(5) Consideration by chairman, mine superintendent and safety engineer of data presented by those interviewed and findings by the members of the committee as to
  (a) Cause of the accident.
  (b) Responsibility for the accident.
  (c) Recommendations to prevent a recurrence.
(6) These findings should be submitted in a report to the president and other executive members of the company through the chairman of the Central Safety Committee.

Duties of Mine Safety Engineer.—To head up this plan and to be responsible for the detailed operation of it, it is suggested that a mine safety engineer be charged with the duties as listed below:

(1) Have general supervision of all safety work.
(2) Make regular safety inspections of all mines accompanied by a mine official.
(3) Where necessary, expedite all safety recommendations.
(4) Analyze all accident reports and investigate all accidents for the purpose of taking steps to prevent their recurrence.
(5) Inspect all mine-rescue apparatus for the purpose of seeing that it is in readiness for any emergency.
(6) See that all first-aid stations are properly maintained.
(7) Check all drawings and co-operate with the operating and construction departments that safety standards in physical conditions of the mines are maintained.
(8) See that proper safety specifications are provided for new equipment.
(9) Follow up machinery contracted for from outside shops to see that standard guards are provided where required.
(10) Supervise and conduct all safety educational work.
(11) The development of safety bulletins should be under his supervision as well as the provision of standard danger signs to be used where necessary throughout the mines.
(12) Attend all safety committee meetings and act in an advisory capacity and, as secretary to each committee, prepare all reports.
(13) Under the direction of the mine superintendent institute all hearings of courts of inquiry and prepare reports of same.
(14) Supervise all training of first-aid and mine-rescue teams.

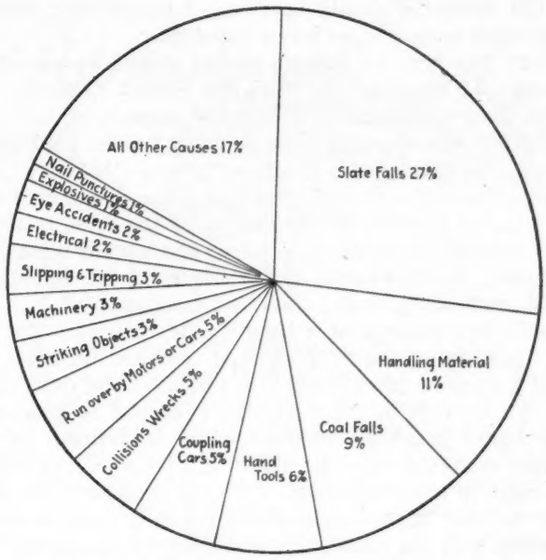


FIG. 3—CLASSIFICATION OF ACCIDENTS BY CAUSES
The more important causes of accidents will be recognized as those peculiar to the mines.

(15) Supervise the general sanitary conditions of all mine camps.
(16) Supervise the organization and maintenance of all fire-protection methods and equipment applied to the mines and camps.
(17) Submit to the management a monthly report of the activities of his department involving
  (a) Number of lost-time accidents—time lost.
  (b) Number of non-lost-time accidents.
  (c) Total number of accidents.
  (d) Causes of lost-time accidents.
  (e) Costs involved through lost-time accidents, non-lost-time accidents, and departments or mine sections involved.
(18) Be responsible where the occasion requires for handling all details relative to workmen's compensation.

Safety Education.—In conjunction with committee organization, one of the most important requirements for efficient accident prevention work is education through the following or similar methods: (a) Bulletin boards, (b) payroll inserts, (c) home-made bulletins describing mine accidents with suggestions of prevention, (d) publication monthly of the comparative accident standing of the company mines in general and sections of the individual mines with the names of the foremen in charge of such sections. These ratings should be posted on the bulletin boards as well.

It has been observed that although many coal companies have gone to considerable expense in providing bulletin boards they do not always appear to realize what they should on their investment because the boards are not properly maintained. Bulletins are always a source of interest to employees and form one of the most important links in the chain of safety education.

It is suggested that a safety bulletin board service be developed in the following detail:

(1) Accident-prevention bulletins should be placed on a well-constructed board devoted entirely to this use.
(2) These boards should be located at points where employees congregate in leisure hours. Such places may be check boards, near entries to mines, outside of time offices, at first-aid stations or other gathering places.

(3) Bulletins should be changed frequently; preferably each week and on a scheduled day.

(4) The type of bulletin posted should be varied by using (a) those of the National Safety Council; (b) cuts from publications relative to hazards of the coal-mining industry or sections of it; (c) home-made posters exhibiting defective material or tools that may cause or have caused accidents. Such bulletin should be placed as near as possible to the section of the mine in which the accident occurred or in which the hazard illustrated is most closely related to the work of the employees. This method will make the most direct appeal.

(5) One bulletin at a time should be used. Four or five posters on the board at one time scatter attention and lessen the educational effect of the point dealt with.

(6) At regular intervals there should be placed on the board graphic presentations of department or sectional standing, also the standing of the various mines in relation to one another. This can be done by showing the number of lost-time accidents in a department or section and the days lost through such accidents. By applying this method to the several mines, accidents and days lost may be totaled for the mines as a whole, so that the accidents and days lost for each mine may then be compared.

(7) It has been found effective to mail to the homes of employees bulletins having an appeal to employees' dependents. This is done in order to obtain the co-operation of families in the work of reducing accidents.

(8) Instead of destroying old and discarded bulletins, they should be given to the local school teachers, police or fire departments.

Probably one of the most effective means of education in accident-prevention work is to bring to the attention of employees at frequent intervals information regarding the subject through the use of payroll inserts. If possible these inserts should be developed from actual company accident experience.

In this case it was suggested that the fifteen mines of the company be put on a monthly competitive basis, through the listing of the number of lost-time accidents occurring, naming the foreman in charge of the particular section in which the accident occurred, and by showing the estimated days lost due to accidents under the various foremen listed.

In connection with placing sections of individual mines on a competitive basis it has also been found practical to have camps compared as units, thus creating a friendly rivalry between the various mines of the company. Successful results frequently are obtained along the line of comparative safety standings through the use of targets, thermometers and other methods of portraying graphically to the employees the number of lost-time accidents occurring in each mine with the total days lost due to these accidents and the consequent effect on coal production.

New Employees.—Casualty statistics indicate that a large percentage of accidents happen to new employees. The company has taken definite steps to control these hazards by issuing rule books to new employees. Rule books should be developed having more specific facts bearing on the causes of accidents. Such information can be easily obtained through an analysis of the present accident statistics and thereafter rules developed which will concretely apply to specific classes of hazards. The development of such a rule book might be made a part of a program of the safety committees. When undertaken by such committees the preparation of rules invariably has the effect of acquainting the employees with the serious hazards of their work and methods of offsetting them. When the rules are developed by the employees themselves they are likely to be adhered to more closely.

It should be a part of the duties of safety committeemen in the various mines to instruct new men in the elements of the safety rules. Such a practice increases the interest of the old employees and puts the new man on a footing of greater confidence with the men with whom he is about to associate daily on the job.

In order that the personnel of the safety committee may attain standing in the mine or community it has been found practical to designate the members of the safety committee through the use of safety buttons or badges. The safety buttons or badges usually are given to a man at the time of his election to the mine safety committee, and he retains it as a token of appreciation by the company for his interest in accident-prevention work.

Many companies have found it helpful to hold at least once a year a large mass meeting of all employees and their families, with the primary purpose of promoting accident prevention. Sometimes these meetings are conducted in the summer in the form of outings; at other times they are held in the winter in theaters or large halls. This method probably is one of the best means of enlisting the aid of employees' families in safety practice. When rallies are held in the hall, one or two reels of motion pictures on causes of accidents have been found effective.

To launch the proposed program of safety organization in this company's camps it was suggested that a general meeting be held in each of the camps, at which time the employees may be addressed on the importance of the work to be undertaken, what lost-time accidents have meant to them through diminished wages, and how their personal efforts are the largest factors in controlling the accident situation. Such talks could be supplemented with motion pictures on mine accidents.

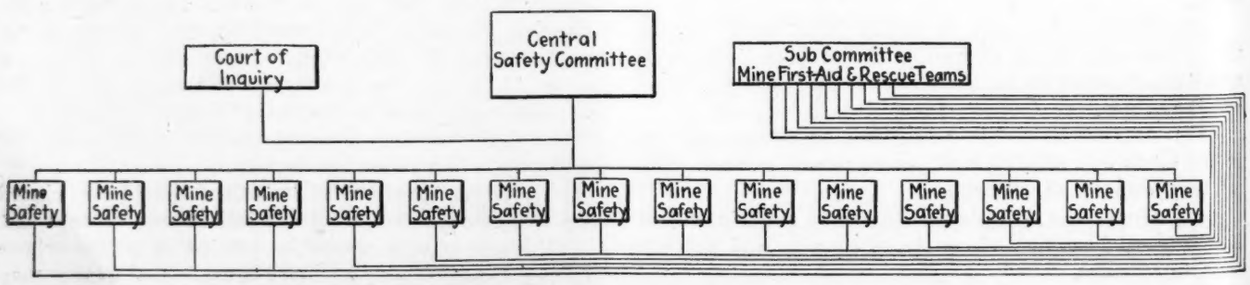
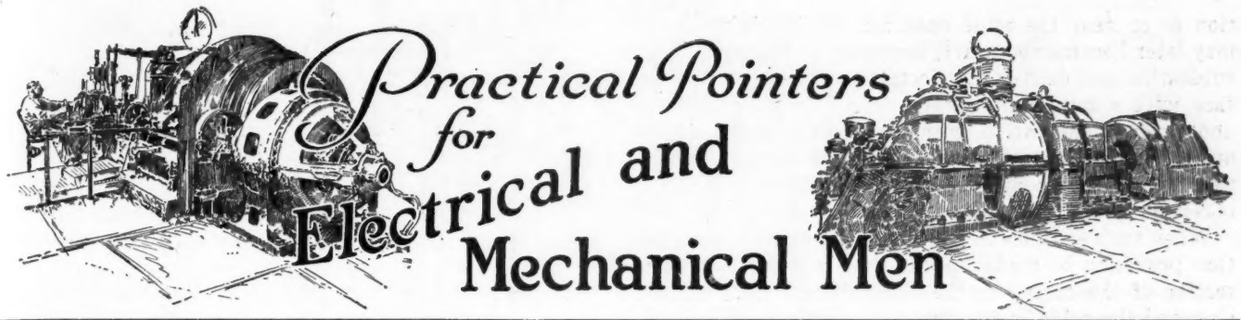


FIG. 4—RECOMMENDED ORGANIZATION FOR PROMOTING SAFETY

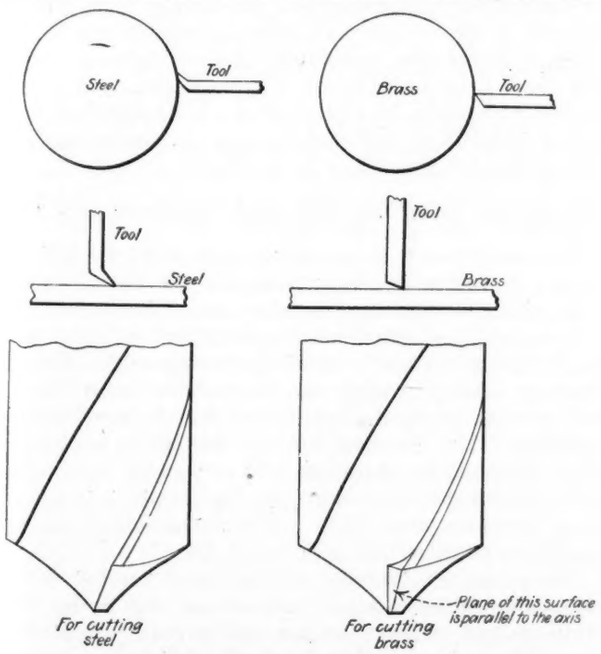
The most important feature of this plan is the subcommittee, through which the co-operation of the men can be gained.



Drilling of Brass Made Easy By Properly Shaping the Drill

INDUSTRIAL brass is divided into two classes, cast brass and wrought brass. Cast brass varies in its zinc content from 30 to 40 per cent. The popular proportion is 35 per cent zinc and 65 per cent copper. If a small percentage of tin is in the mixture the drilling will be considerably easier. Often brass will be found to be exceedingly soft and ductile dragging severely under the cutting action of the tool. When drilling this kind of brass the work can be made somewhat easier by seeing to it that the drill is ground properly and that a lubricant is used which will really assist the drill in cutting and not cause digging into the work.

The one most important thing is the resharpening of the cutting edge of the drill which has been ground to the usual commercial shape. The cutting edge on the lip of the drill should be ground in a way that will eliminate the angle of keenness. It is this wedge-shaped lip of the drill that causes it to dig into the brass especially on sheet brass and brass low in tin content. The accompanying sketches give a better idea of the drill lip before and after grinding. The grinding of the drill lip to this shape can be facilitated by grinding on the side of the wheel and not on its face. Drills ground for drilling brass must be reground to their normal cutting edge when again used for steel and cast-iron drilling.



CUTTING EDGES FOR STEEL AND BRASS

In turning, planing or drilling steel the cutting edge is shaped to cut into the metal, while for brass the cutting edge is made perpendicular to the brass surface so as to have a scraping action. It is important on drills to have the plane of the cutting edge parallel to the axis of the drill.

Brass usually is drilled dry, but lard oil is used on very high speed work. On a job where the drill is digging into the work, however, a few drops of kerosene or cutting compound may be used as a lubricant. A good, cheap cutting compound that will be found useful around a shop is made as follows: 1 lb. sal-soda (carbonate of soda), 1 qt. lard oil, 1 qt. soft soap and enough water to make 10 gallons. Boil this mixture one half hour. This solution may be stored, in the same manner as oil and used for cutting-tool lubricant at a considerable saving in cost.

G. H. RADEBAUGH.

Urbana, Ill.

Use of Borehole Cables for Efficient Power Distribution

ONE of the important advantages resulting from the use of central-station purchased power at coal-mine operations is the use of alternating current and the relative ease with which it is possible to deliver electrical energy at that voltage which is most effective for each piece of equipment. Substations can be located at points most convenient to the center of the load so as to deliver power with the minimum voltage drop and best regulation.

The general tendency is to have the power company deliver energy at a point on the property where its distribution may be made to the equipment through short distributing lines and cables. The best modern practice for the delivery of electrical energy to substations located inside the mines is by means of insulated cables placed in boreholes. This system of distribution may be employed to advantage whether the mine be of the shaft, slope or drift type, except in special instances where the topography of the surface makes such an arrangement impracticable.

For economical reasons the mine substation usually should be located underground and supplied by high voltage current. This is true whether the substation be a converting station for changing alternating current to direct current or whether the substation be a transformer substation feeding alternating current to hoist, pump, compressor or similar drives.

With the more extended use and development of the full automatic converting substation, this practice may be changed or modified. In any event, boreholes for carrying cables of either high- or low-voltage ratings to the inside mine-distributing center will continue to be a necessity if the economies of operation demanded by modern operating conditions are to be realized.

There are still many operations at which the generating or transforming equipment is located in a sta-

tion at or near the mine opening. It is advisable and may later become necessary, however, to locate an inside substation and deliver the electric power at the working face with a minimum voltage drop. In such cases an underground substation or inside electric power distributing center will be advisable and the surface connection will be by means of insulated cables installed in boreholes properly cased and sealed.

When such equipment is installed it is most important that provision be made for the proper placing and protection of the casing in the borehole, the cable suspension and the cable insulation.

Present practice is to drill the borehole from 2 to 3 in. larger than the outside diameter of the casing or conduit to be used, and fill the space between the casing and borehole sides with cement in order to protect the casing properly and also prevent water seepage. Where ordinary pipe casing is used it should be thoroughly cleaned on the inside and given a protective coat of some compound that will prevent corrosion. Plain black iron conduit can be bought in sizes up to 5 in. and, inasmuch as such pipe is made smooth on the inside and has a protective coating, its use is desirable in all cases where an inside diameter not exceeding 5 in. meets the requirements.

It is imperative that the top of the borehole be thoroughly sealed and protected so as not to admit air or water. The casing has a natural tendency to condense moisture when air circulates in it. With the top sealed, however, there is practically no air movement and the heat generated in the cables readily dissipates any slight moisture that may be present.

When the transformation from alternating current to direct current is made on the surface, larger and heavier cables are necessary than in cases where this transformation takes place underground. This is true because of the much greater currents, at the low-voltage direct-current, which must be transmitted through the borehole cables to the mine workings.

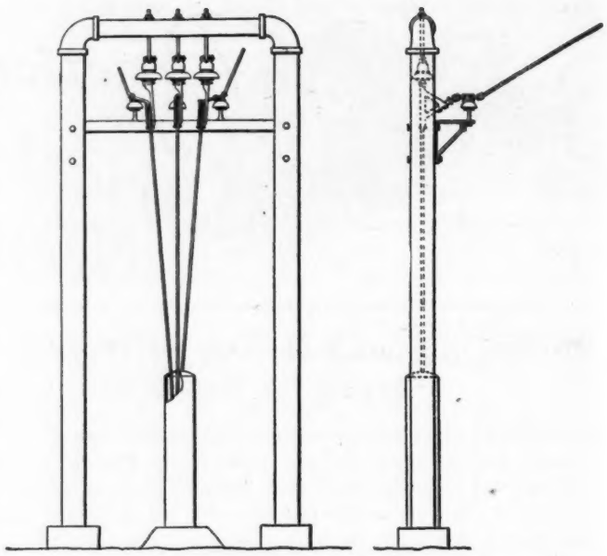
Though insulating problems increase as the voltage is raised, present knowledge of insulating materials makes possible a thoroughly reliable and practicable cable for use at any voltage that is likely to be employed. These cables are not only electrically safe but also are mechanically strong enough to withstand the stresses and strains they must bear.

The usual direct-current voltage employed is 250/275. Occasionally 600 volts direct current is used. The alternating-current voltage most frequently used is 2,200. There are few cases where a voltage in excess of 6,600 will be required.

For 2,200-volt service or higher, lead-covered iron-armored triple-conductor cable with steel supporting wires is highly satisfactory. In fact, in certain cases the use of this type of cable is imperative. In many cases, however, single conductor cables with weather-proof insulation but without lead covering or armor, are preferable.

It is essential that all steel armor or supporting wires be thoroughly protected from the action of moisture and mine air, in order that corrosion may be prevented. Such a cable often is difficult to handle because of its weight, and it also has the added disadvantage of being extremely difficult to repair in case of failure. With iron-armored cable a special supporting device is used, so located as to place the weight of the cables directly on the borehole casing.

When single conductor cables without lead covering or armor are used, the entire weight of the cables is carried by the copper conductor and supported on a frame built directly over the bore hole. Local conditions will usually determine the character of this support, but in any event, it will be relatively inexpensive. By reference to tables showing the weights that copper conductors of various size will support, the maximum permissible length of cable for a given size can be determined without difficulty.



BOREHOLE CABLE SUPPORT

These supports can be made very efficient and yet reasonable in cost by the use of standard line equipment and material commonly used about a coal mine. The borehole casing should be effectively sealed to prevent corrosion by moisture condensation inside the pipe.

The ease with which borehole cables can be removed for inspection and repair, of course, is dependent on whether armored or unarmored cables are employed. In the former case, removal is necessarily very difficult because of the weight and relative inflexibility of the cable, whereas the unamored single conductor cables can readily be brought up for inspection and repair by the men employed at the mine. With ordinary care in the installation and maintenance of borehole cables, defects are not very likely to develop.

Boreholes Ward Off Abrasion, Moisture and Air

In cases where it is desired to carry a mine telephone circuit down the borehole alongside the power cables, it is essential that the telephone circuit be enclosed in a thoroughly grounded metallic covering. Often it may be deemed advisable to carry the power cables down a borehole made expressly for the purpose, even though the hoisting or ventilating shafts may be conveniently available. The borehole affords the cables protection from abrasion, moisture and air, as well as from other disturbances encountered in open shafts, which in almost every instance more than justifies the additional expenditure required for cable boreholes.

The advantage of mine substations connected to the outside by cables installed in boreholes will be increasingly evident. The substation can be readily located at accessible and convenient, yet out of the way, points, and can be moved as required and make possible most efficient application of electric power to the mine workings.

Charles M. Means,
Pittsburgh, Pa. Consulting Engineer.

Problems of Operating Men

Edited by James T. Beard

Use of Steel Track Ties in Heavy Motor Haulage

Efficiency in Heavy Traffic Doubted—Instance of Wooden Ties Replaced by Steel Ones—Useful in Rooms, Pillarwork and Back Entries

THE reply given to the inquiry regarding the use of steel track ties, in mines where heavy motor haulage is employed, expresses the opinion that there are limitations to the use of steel ties in mine tracks and asks for the experience of others in this regard. My own conclusion accords with that expressed by the editor, namely, that steel track ties are not as efficient where 10- and 12-ton locomotives are in use.

Experience with the Fairmont, Cambria and Carnegie steel mine ties leads me to say that, while the ties are useful and efficient wherever it is practicable to use them, I do not consider that main haulage roads in mines is their province. When taking charge of the Raleigh Wyoming Coal Company's mines, at Edwight, W. Va., as superintendent, I found all the mine roads laid with steel ties.

Difficulty Experienced with Steel Ties

There was so much difficulty in keeping the tracks in alignment on the main road, that I found it necessary to replace the steel ties with wooden ones, in order to secure a more stable track. The wooden ties enabled the track to be properly aligned, ballasted and surfaced, which I had found practically impossible to accomplish with the steel ties.

Let me say, however, I consider it good practice to use steel ties, in combination with the wooden ones, on main haulage roads, spacing the steel ties about 10 ft. apart. The use of the steel ties, at intervals of 10 ft., prevented the spreading of the track, in case a section of wooden ties failed because of dry rot.

It will often happen that wooden ties will get in this condition and give way before they are discovered, even in the best managed mines. Where dry rot has set in, the weakened condition of the tie does not appear on a casual inspection of the track; but a derailed car will quickly find the weak part and the result is a wreck of the entire trip, before it can be brought to a standstill. A few steel ties spaced between the wooden ones will generally prevent this accident and avoid delay in haulage on the main roads.

It is my belief that the province of steel mine ties is largely in rooms, pillarwork and back entries or aircourses that are cut off every 200 or 300 ft., making it necessary to pick up the track in sections and move it forward. Steel ties can be used with great success for extension or jumper rails, until the face of a working place is advanced far enough to permit the laying of a full length of rail and permanent track. Also, steel ties may be used to great advantage on all temporary tracks, in haulage roads.

J. W. Powell.

Charleston, W. Va.

ANOTHER LETTER

Steel ties give satisfaction under 15- and 20-ton locomotives—In use for 10 years in another mine putting out over 5,000 tons of coal per day, with 8-ton locomotives.

REGARDING the use of steel track ties, in heavy motor haulage in mines, permit me to say that we have been using these ties in the mines of the Old Ben Coal Corporation for many years and they have given good satisfaction. In our Mine No. 16 we are using ties under 15- and 20-ton locomotives.

Our oldest installation of this kind is at Mine No. 9, West Frankfort, Ill. We started this mine, in 1913, with a complete bottom layout of steel ties on our main haulageways. When the installation was first completed, we were using 6-ton locomotives; but, during the past six years, we have employed 8-ton locomotives entirely, in that mine.

The fact that during this period, Mine No. 9 has produced from 5,000 to 5,500 tons, each day that the place has worked, gives a fairly good idea of the traffic conditions. I am advised by Superintendent Dunn, in charge, that it has never been necessary to replace a steel tie, in the bottom layout just mentioned.

While there are, no doubt, many mines where the local conditions are such as to render the use of steel ties unsuitable, that is not the case in our field, where we have found their use very much worth while. The question of whether steel ties will stand up under heavy locomotives is best answered by saying, Select a tie that is heavy enough to take care of the duty required.

P. W. Beda, Vice-President,

Chicago, Ill. Old Ben Coal Corporation.

Keeping Water Out of Slope

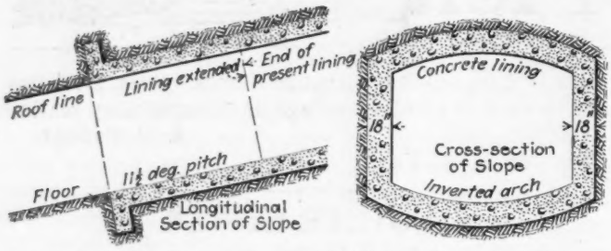
Shallow mines liable to be flooded in wet seasons—Concrete lining must include inverted arch at the floor.

THE difficulty encountered by Joseph Magdalena, regarding the flooding of his slope mine during a rainy season, as described in his letter, *Coal Age*, Aug. 23, p. 291, is no doubt typical of most shallow mines. He explains that, after going to the trouble and expense of lining the top and ribs with solid walls of concrete 18 in. in thickness, the water still came in through the floor of the slope.

His proposal to place a door at the inby end of this concrete lining, at the foot of the slope, has the objection that it would not be possible to work the mine during a flood. The loss on this account, together with the addi-

tional cost of pumping the water from the 300-ft. slope, he would find a large item—too large indeed to be considered from an economical standpoint, in the operation of a mine.

Allow me to suggest lining the floor of the present tunnel with a concrete lining, in the form of an inverted arch, as shown in the accompanying figure. If this work



LONGITUDINAL AND CROSS-SECTION OF SLOPE

is done in sections and care taken to give the concrete floor a good bedding and to secure a watertight joint with the lining of the ribs, I believe the plan will wholly eliminate the trouble, by preventing the seepage of water with which he is now contending.

To insure a complete job, let me say the concrete lining, including the roof, sides and floor, should be extended a distance down the slope to where the coal is found to be solid and free from breaks. At that point, the lining should be extended in wings to give it a better connection with the strata, as I have indicated in the longitudinal section shown in the figure. The depth of these wings will naturally depend on the nature of the strata. Finally, should the lining at any time show signs of leakage, a cement-gun should be used to make it watertight.

CYMRO.

Superior, Colo.

ANOTHER LETTER

Work of lining the slope incomplete—Flooding of the mine only what might naturally be expected—Lining should have been in the form of a barrel.

AFTER carefully reading the letter of Joseph Magdalena, *Coal Age*, Aug. 23, p. 291, asking for suggestions regarding the best means of preventing the flooding of his slope mine, which has occurred always at the time of the spring rains, my conclusion is that the work done in lining the slope was incomplete.

The inquirer says that the slope was started in a bed of quicksand 30 ft. deep and driven on an inclination of 11½ deg. Because the mine was twice drowned out, by water running down the slope, that opening has been lined with 18-in. concrete walls and roof, extending down both sides of the road a distance of 300 ft. to the coal, at a cost of $9,000.

The statement that, in spite of all this, water continued to seep down behind the walls and came up through the floor, shows that the result was only what one would naturally expect. To my mind, the work was only three-fourths complete, as the floor of the slope was still left exposed and unprotected.

My plan would be to line this slope with an extra good brick wall, in the form of a barrel, and further protecting this with an inner lining of concrete. At the entrance or portal I would build a wall about 4 ft. high to prevent any water running into the slope at the mouth. This double wall of brick and concrete should be extended to the coal, which should be sheared to present a good solid face. Beyond this point, the concrete lining should be extended say 20 ft. along the coal ribs.

Such a plan I feel sure would have put an end to any further trouble from water entering the mine through the slope. As the work progressed, the track should be laid on a good bedding of waste material held in place by crossboards. This ought to provide the needed protection and prevent any damage being done to the slope lining should cars be derailed.

With regard to the steel door, which the inquirer proposed to build at the foot of the slope, I fail to see the need of such a trap. In my opinion, it would be both useless and dangerous. Allowing the mine has another opening that would permit of the place being worked at the time of a flood, neither could the door be made watertight or capable of withstanding the great pressure, estimated as 112 tons when the slope is full of water.

Before closing, let me say that if the mine openings extend under a creek bottom, there should be heavier walls of brick and concrete, at that point, to guard against a possible break in the strata and the flooding of the mine by a sudden inrush of water from the creek.

OSCAR H. JONES,
District Mine Inspector.

Wilder, Tenn.

Finding the Remedy

Ineffectual efforts to prevent the occurrence of explosions in mines—Regarding the situation broadly—Ventilation the greatest need.

MANY have been the causes assigned by different writers, in *Coal Age*, as being responsible for the continued occurrence of mine explosions. The lack of discipline in the mine, bad practices of miners, inefficient management on the part of mine officials and even the prevalence of strikes have been referred to as producing conditions that bring about mine explosions.

While all of these items have their place and contribute to disaster to a greater or less extent, I cannot regard them as being chief causes of explosions. If military discipline prevailed in a mine, that would not prevent an explosion of gas or dust if the ventilation was insufficient and the air current not properly conducted through the workings, so as to keep the places clear of gas and safe for work.

Numerous efforts have been made by the government to ascertain just the conditions under which explosions take place and to find a remedy for their occurrence. It seems to me, however, that many of these efforts have been wasted. To my mind, instead of training men so largely in rescue work, why not start at the other end and take means to urge the need of better ventilation.

NEED OF A BROADER VIEW OF SITUATION

It would seem almost as if we had concluded that the occurrence of explosions in mines is part and parcel of the coal industry. Now, I am a great believer in first-aid training and rescue work; but let that have its place and let us give greater heed to ventilating our mines in a way that will make them immune to such occurrences.

Perhaps I am wrong, but it seems to me that we do not regard the situation as broadly as we should. I am reminded, just here, of a story told me when I was a boy. A mule crossing a bridge spied a knothole in one of the planks near the side of the bridge. The mule imagined that he could fall through that knothole and, to avoid the danger, ran sideways till he fell off the other side of the bridge and was drowned.

We sometimes become so absorbed in our study of certain methods, that we fail to heed more important things that should receive our attention. Like the mule, our eyes are riveted on the knothole. For my part, I do not believe that mine explosions are a necessary part of the work of mining coal. I believe that, with good ventilation and more uniformity in our mining laws in the different states, explosions in mines can be eliminated.

Parnassus, Pa. C. W. ATKINS.

Inquiries Of General Interest

Essential Requirements of the Hydraulic Ram

Province of the Hydraulic Ram—Energy of Flow in the Drive Pipe Proportioned to the Ratio of Pumping Head to Supply Head

WE HAVE made several attempts to install a hydraulic ram for the purpose of forcing water from a supply basin located about 50 yd. distant and lifting it into a tank elevated 40 ft. above the ground. A pump was formerly used to pump the water from this reservoir into the tank, which forms the main supply at the plant. To avoid the necessity of operating this pump we desired to replace it with an automatic ram, which is not wholly satisfactory.

The surface of the water is from 6 to 8 ft. above the ground where the ram was placed, and the lift to the surface of the water in the tank is 40 ft. We used a 2-in. pipe to conduct the water from the supply basin to the ram and the same size of pipe is used to carry the water from the ram up into the tank. I should state, here, that the supply pipe is carried over the dam of the reservoir, instead of being laid in a ditch, and, on this account, the pipe line acts as a siphon at that point. I want to ask if that hinders the action of the ram. Also, kindly explain what are the essential requirements for successful operation.

———, Ky. MINE SUPERINTENDENT.

In regard to the siphoning action, at the head of the supply pipe where it is carried over the dam, the only effect is to increase the pipe resistance by reason of its increased length. The effective head in the drive pipe is the same as if the line of pipe was straight. The head is measured, vertically, from the surface of the water in the reservoir to the level of the overflow valve, as indicated in the accompanying figure. As a result of increasing the length of the pipe by carrying it over the dam, the velocity of the flow in the drive pipe is decreased slightly. It is assumed that all the joints are airtight and the mouth of the pipe is fully submerged.

The province of a hydraulic ram is to furnish a means of lifting water automatically through a height greater than the supply head. This is accomplished by utilizing the energy of the water flowing in the drive pipe under gravity, by transmitting that energy to the water in the column pipe. In the figure is shown a diagrammatic elevation of the arrangement of a hydraulic ram with reference to the supply basin, to which it is connected by the drive pipe. The pipe should have an inclination of, say not less than 1 in 6. Too small an inclination will reduce the efficiency of the operation, while too great an inclination causes too great a strain on the pipe and the valves.

The action of a hydraulic ram is wholly automatic when the two valves have been properly adjusted to suit the conditions. It will be observed that the overflow valve *A* acts upward, in closing; while the discharge or clack valve *B*, at the foot of the air chamber, acts downward, in closing. At the start, the overflow valve is open and the discharge valve shut, these positions being due to the gravity of each valve. The water flowing from the supply basin through the drive pipe escapes through the overflow valve, until the increasing velocity closes that valve suddenly. The impetus of the entire mass of water in the drive pipe, at that moment, acts to force the discharge valve upward, against the pressure and head of water in the air chamber and some of the water enters the air chamber. The action is only momentary, however, and the compression of the air in the chamber overcomes the impetus of the water and again closes the valve *B*. In the recoil that follows, the overflow valve *A* drops and water again escapes at that point, until its velocity is sufficient to force the valve upward, closing it as before and repeating the rush of more water through the discharge valve into the air chamber.

The connection of the column pipe with the air chamber is indicated by the dotted circle near the

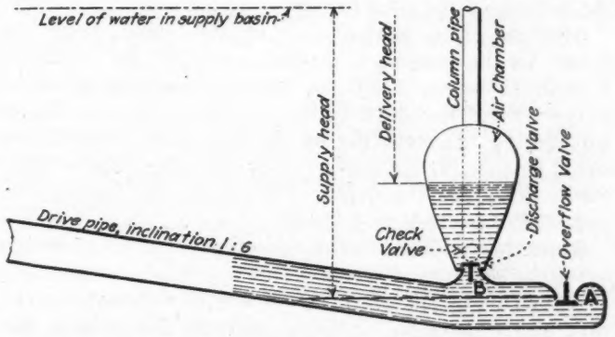


DIAGRAM ILLUSTRATING THE HYDRAULIC RAM

bottom of the chamber. At this point, there is another valve not shown in the figure. This is a check valve, acting to prevent any back flow of water from the column pipe into the chamber. It will be understood that the compression of the air in the air chamber acts to force the water from that chamber into the column pipe at each throb or stroke of the system, the closing of the discharge valve *B* being immediately followed with the opening of the check valve at the foot of the column pipe.

The successful operation of a hydraulic ram depends largely on the correct adjustment of the overflow valve. The weight of the valve is partially supported by a spring or counterpoise that enables the valve to act freely between the atmospheric pressure and its gravity and the impetus of the rushing water escaping at that point. The length of the drive pipe plays an important part, by reason of its greater or less resistance to the energizing flow from the supply basin to the ram.

The ratio of the delivery head to the supply head must be proportioned to the length of pipe, this ratio

decreasing as the length of drive pipe increases. In practice, the ratio of the delivery head to the supply head may vary from, say 5 to 10, depending on the length of drive pipe. A common rule for determining the diameter of drive pipe required, for any given quantity of water desired, is to multiply the required quantity of water to be delivered (gal. per min.), by the ratio of the delivery head to supply head and extract the square root of $\frac{1}{12}$ of the product.

For example, in the present case this ratio being 40/8 = 5, for a delivery of, say 100 gal. per min., the required diameter of drive pipe would be $d = \sqrt{\frac{1}{12}(5 \times 100)} = 6\frac{1}{2}$ in. It is well to make the diameter of the delivery pipe from 0.4 to 0.5 times that of the drive pipe, giving in this case, say from $2\frac{1}{2}$ to 3 in. We would suggest using, in the present case, a 6-in. drive pipe and a 3-in. delivery pipe, for a flow of 100 gal. per min. into the tank.

The hydraulic ram is so wasteful of water that it cannot be recommended for pumping, except where the supply of water is inexhaustible. The water pumped rarely exceeds 10 per cent of the flow from the basin.

Examination Questions Answered

Mine Foremen's Examination, Olympia, Wash., Aug. 1, 1921

(Selected 1st-Class Questions)

QUESTION—*A seam pitching 27 deg. 30 min., has a slope driven for a depth of 2,655 ft. on the seam. The elevation of the top of the coal, at the slope mouth, is 1,910 and the surface elevation directly over the bottom of the slope, is 1,872 ft.; what is the cover over the bottom of the slope?*

ANSWER—The vertical fall of the slope, from its mouth to the bottom, is 2,655 × sin 27° 30′ = 2,655 × 0.46175 = say 1,226 ft., which makes the elevation at the foot of the slope 1,910 — 1,226 = 684 ft. Then, subtracting the elevation on the top of the coal at the slope bottom, from the surface elevation above that point, gives for the depth of cover at the foot of the slope 1,872 — 684 = 1,188 ft.

QUESTION—*What are the essentials in pillar drawing to insure safety and economy?*

ANSWER—In planning the work with reference to the safe and economical drawing back of the pillars, due regard must be had for the relative width of pillar and opening, which must be determined by a careful study of the conditions relating to roof, floor and seam, including the depth of cover, thickness and inclination of the seam and the possible presence of gas and water or slips and faults in the strata. The pillars must be of such a size as to avoid the occurrence of a squeeze, which would crush the pillars and make their extraction difficult and dangerous. Only experienced men must be employed in the work of drawing pillars. If gas is present in the roof or floor care must be taken to avoid danger from its accumulation on the falls and only safety lamps or electric cap lamps must be used. Before the work of drawing pillars, in a section of the mine, is completed, the possible effect on adjoining sections and on the surface must be carefully studied. It is important to keep the breakline across the ends of the pillars in a practically straight line.

QUESTION—*How many tons of coal is there in a room 325 ft. long and 22 ft. wide, on a seam of coal 4 ft. 8 in. in thickness?*

ANSWER—Not knowing the specific gravity of the coal, which may vary from 1.2 to 1.5 or more, it is only possible to assume an average weight of 1.3 × 62.5 = 81.25 lb. per cu.ft., for this coal in the solid. The cubic contents of the room is 22 × 325 × $4\frac{2}{3}$ = $33,366\frac{2}{3}$ cu.ft. Finally, the weight of coal filling this space, on this assumption, would be ($81\frac{1}{4}$ × $33,366\frac{2}{3}$) ÷ 2,000 = 1,355 tons. Or, assuming a weight of 80 lb. per cu.ft. for the coal, making 2,000 ÷ 80 = 25 cu.ft. per ton of coal, the weight of coal, in the solid, in this room, would be $33,366\frac{2}{3}$ ÷ 25 = $1,334\frac{2}{3}$ tons.

QUESTION—*What would you suggest to prevent, as much as possible, accidents from the following causes: (a) Falls of rock and coal; (b) mine cars and haulage; (c) injuries from shots and gas?*

ANSWER—(a) To reduce to a minimum accidents from falls of rock and coal, there is needed careful instruction of the miners and close supervision of their work, during working hours; careful inspection of each working place; and maintaining discipline in the mine, by suitable punishment for any violation of mine rules and regulations or disobedience of orders. An ample supply of posts and cap-pieces of the proper size must be kept on hand and ready for use in every place.

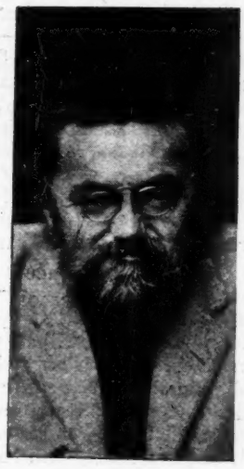
(b) To reduce the number of accidents from the movement of cars in rooms and on haulage roads, no cars must be left standing where they will obstruct haulage on the main roads, or where they will be in danger of getting loose and running out onto the main track. Careful instructions must be given to the men in respect to cars left at the faces of rooms, or on side tracks, to make sure that they will not be moved from their position. Separate travelingways must be provided so that men will not be compelled to travel the main roads on their way to and from work. Where this is necessary, shelter holes must be provided and kept free of all obstructions, at regular short intervals on roads where rooms are not turned. All haulage roads should be provided with an ample clearance on at least one side of the track and continuous on that side. A carefully arranged schedule should be maintained providing for the movement of loaded and empty trips and a good signal system should be installed between the shaft bottom and inside partings. In slope haulage and on all inclines where cars must be hoisted or lowered, care must be taken to avoid accidents from the breaking of ropes or cars getting loose and running down the incline.

(c) To reduce the number of accidents in shotfiring and from the presence of gas, a careful inspection of the mine and working places must be maintained. The work must be done by competent shotfirers and firebosses and the former should be authorized to examine and pass on all holes drilled by the miners. The safest practice is to authorize the shotfirers to charge and fire all shots that in their judgment are safe, after the men have left the mine, examining every place for gas before firing a shot therein.

Steinmetz, Electric Wizard, Dies Suddenly

Dr. Charles Proteus Steinmetz, electrical scientist, died at his home at Schenectady, N. Y., Oct. 26. His death was due to heart failure brought on by a physical breakdown following a recent trip to the Pacific coast which overtaxed his vitality. For the last two weeks he had been under the care of a physician and nurse, but was regarded by them as doing well and as making progress toward complete recovery.

Charles Proteus Steinmetz was born in the old city of Breslau, in Silesia, on April 9, 1865. He obtained his education in the common and high schools of Breslau and in the famous university in his home town. He fitted himself for astronomy in the university at Breslau, but in the autumn of 1888 entered the great polytechnic school at Zurich, and studied mechanical engineering, turbines, steam engines, bridge construction and other such subjects. The next year he and an American fellow student with whom he had roomed came to America in the steerage of a French liner.



CHARLES P. STEINMETZ

Soon after landing he obtained employment at Yonkers, N. Y., as a draftsman, at $12 a week, in the office of Rudolph Eickemeyer, electrician, meantime pursuing his studies, at night, and writing scientific papers for the press.

A few years later, in 1892, the establishment for which he was working was acquired with various others by the General Electric Co., and he was sent to Lynn, Mass., by that concern to have charge of one of its plants there. Thence, on Jan. 1, 1893, he was transferred to headquarters at Schenectady, as the chief consulting engineer of the General Electric Co., a place which he filled for the remainder of his life and in which his chief work was done and his most important inventions were made. In 1902 he became also professor of electro-physics in Union University, and continued in that office until his death. In 1912 he was appointed president of Schenectady Board of Education, and in 1915 was elected to the Common Council on the Socialist ticket. Last year he was the candidate on the Socialist ticket for State Engineer and Surveyor.

He was for a time president of the American Institute of Electrical Engineers, and was a member of numerous scientific and educational organizations. Harvard gave him an honorary A.M. degree in 1902, and Union University a Ph.D. in 1903.

He never married. In stature he was almost a dwarf, but he had a massive head and brilliant eyes, commanding the attention of everyone who saw him. His special interests in electrical science were magnetics, the symbolic method of alternating-current calculations, and transient phenomena; but there was scarcely a detail of any branch of electrical science, of astronomy or of mathematics with which he was not conversant in masterly fashion. His writings were voluminous.

The body of Dr. Steinmetz lay in state at his home Sunday. Burial took place Monday afternoon, after private funeral services, at Vale Cemetery in a plot which the inventor acquired several years ago. The Rev. Ernest T. Caldecott, pastor of All Souls' Unitarian Church, officiated at the services, assisted by the Rev. Dr. A. W. Clark.

Miners' Union Again Victorious In Coronado Case

Interstate Trade Conspiracy Not Proved, $700,000 Verdict Voided—Individual Acts Do Not Make Organization Guilty—Case to Be Appealed

Under instructions from Judge John C. Pollock, a verdict for the defense was returned Oct. 27 in the U. S. District Court at Fort Smith, Ark., in the suit of the Coronado Coal Co. and associated corporations of the Bache-Denman Coal Syndicate against the United Mine Workers of America, in which damages of $2,222,000 were sought as a result of alleged property loss and resultant interference with non-union mining in the Hartford Valley coal field of Arkansas in 1914. Henry S. Drinker, of Philadelphia, was counsel for the plaintiffs, and Henry Warrum, of Indianapolis, presented the union's case. The trial lasted two weeks.

This is the second victory for the miners' union, the U. S. Supreme Court having ruled last year that in the first trial, which resulted in a verdict of approximately $700,000 for the plaintiffs, the coal companies had failed to establish a basis for the suit under the Sherman law, and ordered a new trial.

Judge Pollock held that the evidence had failed to establish a direct purpose to interfere with interstate commerce, but rather a conspiracy to prevent the operation of the mines as non-union workings. The ruling also pointed out that under the constitution of the United Mine Workers no individual can bind the entire organization; that until the executive board acts no one is bound except individuals who may be involved in any activity, and upon that ground he held that the International union was not shown to be bound by the acts of those responsible for property damage during the strike.

"Before the plaintiffs can ask for a verdict against the defendants or any of them," Judge Pollock said in directing the verdict, "they must establish a conspiracy to do what was done; they must establish that everyone against whom they ask judgment and a verdict knowingly participated in what occurred; they must establish not only that property was lost through the conspiracy but that the conspiracy was formed for the direct purpose of restraining or monopolizing interstate commerce.

"Almost every act affects interstate commerce. It was never the intention of Congress that anything except something directly interfering with interstate commerce should be taken out of the state jurisdiction. We must always have a line of demarcation. The Supreme Court, on much the same evidence, had placed this case on one side."

Judge Pollock held that the mining of coal is not interstate commerce and the fact that it may be shipped later in interstate commerce does not alter the situation.

On the question as to whether the evidence connected the general organization—the International union—with the Hartford Valley troubles, Judge Pollock said:

"They have the right to unionize the entire country. Not only have they unionized the coal miners of many states, but the evidence in this case shows they have members in foreign countries. Before they ask any one to become a member, he has a right to say: 'What obligation am I taking? On what terms? What powers have they to bind me to what they do, or to bind any money I have contributed?'

"They have put these powers into the constitution and the Supreme Court has construed that constitution to mean that whenever the executive board representing all of them, put there for that purpose—that whatever they do binds every one of them. Until they do act, no one is bound but the individual. The international union is not bound."

Somewhat of a sensation was created when the plaintiffs produced as a witness Oct. 22 James McNamara, "captain" of the attacking forces which in 1914 drove the non-union miners from the field and caused the complete shut-down of the Bache-Denman Coal Co. properties in the Hartford Valley district.

McNamara was on the stand two hours, telling in detail of the alleged conspiracy to forcibly eject from the Hartford

Valley workmen and guards of the Bache-Denman company and to burn and dynamite the property. He told of speeches made prior to the trouble by himself and others. All of the speakers urged that the miners use no violence, but to go peaceably and persuade men at the mine to come out and join the union.

"What was the purpose of the speeches?" he was asked.

"To keep public opinion on our side," was the answer. "And, in case there should be any violence, to show that we went down there to get the men to join the union. I know that this is a practice everywhere when the mine workers have trouble with operators."

McNamara told of conversations with John P. White, International president of the United Mine Workers in 1914. P. R. Stewart, then district president, said, according to McNamara, "that he and White had arranged a plan to prevent Bache from producing coal." The witness, who served a two-year sentence following the Hartford Valley troubles on a plea of guilty to conspiracy to violate a federal injunction, said that he had been working as a non-union miner most of the time since he had been released from prison.

Pete Hanraty, former president of District 21, was another interesting witness for the plaintiffs. The former union official testified that it had been his practice as district president to notify International officers when an operator attempted to operate on the open-shop plan, because, he said, "it involves every district and the International because an open-shop or a non-union mine can produce coal cheaper than a union mine. If allowed to go on it is only a question of time until the union would go out of existence."

Roland Ford Barns, captain of mine guards; English Daugherty, 66-year old victim of an attack on the Prairie Creek mine, July 17, 1914; M. W. Weston, who operated a slope mine near the scene of the trouble in 1914, and U. S. Judge Frank A. Youmans were other witneses for the plaintiffs.

Henry Warrum, defendant counsel, offered several objections to testimony presented by the plaintiffs, claiming that the higher courts had previously held that the identical testimony did not establish the grounds which the plaintiff claimed, but Judge Pollock overruled the objections.

Notice was given that the case would be appealed.

Union Combats Co-operative Mining Movement in Southwest

Operation of several mines in the Kansas field during the summer by miners on a co-operative basis has aroused union officials to an effort to stop what they term a drift toward the open shop in District 14. Meetings are being held at various towns in the district each Sunday and the miners are being exhorted to take no part in any operations that have not the union's sanction.

The first of these meetings was in Liberal, Oct. 21. There a resolution was adopted to the effect that the members regretted "any and all propositions along the line of co-operative or any other method than the joint agreement now in effect between operators and miners." The local pledged itself to work among other locals of its section to "secure their assistance in stopping the miners in this end of the field who are operating outside our organization."

BIDS OPENED by the U. S. Shipping Board on Oct. 25 for furnishing and delivering f.a.s. vessels New York harbor on Oct. 27 1,800 gross tons of either Pool 9 or Pool 71 bituminous coal brought prices from ten dealers, ranging from $4.18 to $5.25 per gross ton, or on a basis of about $1.02 to $1.97 per net ton f.o.b. mine. The contract was awarded to the Rhodes Fuel Co., the lowest bidder. Bids opened by the Board on Oct. 15 for the same quality of coal resulted in offerings ranging from $4.47 to $5.25 per gross ton.

PLANS FOR THE ANNUAL CONVENTION of the United Mine Workers of America will be considered at a meeting of the International executive board to be held Nov. 13 at 10 a.m. in Indianapolis, at the call of John L. Lewis, international president. Other matters, including the recent strike in the anthracite fields in Pennsylvania, will be considered by the board, which probably will be in session for a week or more. Plans for increasing the membership also will be discussed. The international convention will be held in January. At this meeting a tentative wage scale will be submitted to the membership in lieu of the present one, which expires April 1 next.

Coal Produced in the United States in 1922*

(In Net Tons)

State	Loaded at Mines for Shipment	Sold to Local Trade and Used by Employees	Used at Mines for Steam and Heat	Made Into Coke at Mines	Total Quantity	Total Value	Average Value per Ton	Number of Employees: Underground Miners' Loaders, etc.a	Number of Employees: All Others	Number of Employees: Surface	Number of Employees: Total	Average Number of Days Worked
Alabama	17,376,060	360,811	290,187	297,682	18,324,740	$42,856,000	$2.34	16,615	6,528	5,026	28,169	215
Alaska	76,111	1,221	1,943	.....	79,275	431,000	5.43	149	113	168	430	147
Arkansas	1,066,751	15,112	28,183	.....	1,110,046	4,592,000	4.14	2,386	973	676	4,035	81
California, Idaho, and Oregon	17,011	3,662	6,220	.....	26,893	104,000	3.87	20	25	15	60	250
Colorado	9,144,680	542,783	232,255	99,879	10,019,597	31,701,000	3.16	7,911	3,158	2,437	13,506	191
Georgia	41,809	535	2,114	16,178	60,636	246,000	4.06	68	23	59	150	242
Illinois	53,695,042	3,227,015	1,545,679	.....	58,467,736	168,925,000	2.89	61,592	24,704	10,040	96,336	120
Indiana	18,142,677	537,310	452,902	.....	19,132,889	54,524,000	2.85	20,605	8,288	4,315	33,208	110
Iowa	3,653,352	579,907	101,902	.....	4,335,161	16,119,000	3.72	8,369	3,477	1,011	12,857	131
Kansas	2,797,291	96,831	61,048	.....	2,955,170	10,816,000	3.66	5,093	1,319	947	7,359	125
Kentucky	40,554,793	991,145	534,578	53,659	42,134,175	127,037,000	3.02	34,189	16,207	10,528	60,924	140
Maryland	1,165,738	44,676	12,293	.....	1,222,707	4,122,000	3.37	2,563	663	529	3,755	101
Michigan	855,917	13,814	59,659	.....	929,390	4,693,000	5.05	1,335	639	192	2,166	162
Missouri	2,620,074	228,327	76,349	.....	2,924,750	11,153,000	3.81	5,370	1,848	1,532	8,750	113
Montana	2,395,091	92,413	84,717	.....	2,572,221	8,208,500	3.19	2,194	904	537	3,635	140
New Mexico	2,871,424	35,931	57,479	182,339	3,147,173	10,977,000	3.49	2,253	969	779	4,001	216
North Carolina	68,524	1,500	8,546	.....	78,570	388,000	4.94	50	45	32	127	167
North Dakota	1,078,139	211,193	38,232	.....	1,327,564	3,513,000	2.65	846	290	512	1,648	175
Ohio	24,434,491	1,953,222	566,078	.....	26,953,791	87,056,000	3.23	34,134	11,772	8,288	54,194	100
Oklahoma	2,627,406	28,381	146,724	.....	2,802,511	11,527,000	4.11	4,390	2,234	1,204	7,828	114
Pennsylvania (bituminous)	94,939,698	5,130,548	2,214,591	10,863,471	113,148,308	351,777,000	3.11	114,541	44,910	29,387	188,838	154
South Dakota	450	7,302	.....	.....	7,752	22,000	2.84	32	.....	.....	32	138
Tennessee	4,546,552	111,977	113,854	104,391	4,876,774	14,096,000	2.89	6,996	2,537	1,916	11,449	163
Texas	1,076,595	12,557	16,855	.....	1,106,007	2,563,000	2.32	1,994	541	306	2,841	185
Utah	4,530,382	61,930	99,282	300,414	4,992,008	15,687,500	3.14	2,302	1,327	1,092	4,721	204
Virginia	9,650,588	156,354	100,020	584,212	10,491,174	27,083,000	2.58	6,290	4,567	2,542	13,399	198
Washington	2,392,305	63,135	84,700	41,025	2,581,165	10,279,000	3.98	2,434	1,170	877	4,481	194
West Virginia	76,150,385	2,918,643	709,139	710,025	80,488,192	236,162,000	2.93	57,785	33,029	19,200	110,014	143
Wyoming	5,708,071	77,914	185,739	.....	5,971,724	18,162,000	3.04	5,266	2,377	1,402	9,045	128
Total, bituminous including wagon mines	383,677,407	17,506,149	7,831,268	13,253,275	422,268,099	1,274,820,000	3.02	407,772	174,637	105,549	687,958	142
Pennsylvania anthracite	46,002,699	2,778,200	6,302,123	.....	54,683,022	273,700,000	5.01	72,527	41,752	42,570	156,849	151
Grand total	429,680,106	19,884,349	14,133,391	13,253,275	476,951,121	1,548,520,000	3.25	480,299	216,389	148,119	844,807	144

* Statistics compiled by L. Mann, U. S. Geological Survey, Oct. 27, 1923. (a) Includes shotfirers also.

Wide-Margin Sales of Anthracite Waning, Says Trade Commission

Handling Charges by Wholesalers Shrinks from $1 in Some Instances to 25c.—Resumption of Mining Dispels Panic Demand

"Anthracite wholesalers," says the second report of the Federal Trade Commission on anthracite, released Oct. 29, 1923, "are required to report to the Commission, as to domestic sizes only, their sales of premium or unusually high-priced coal. While excessive wholesalers' margins and scalping by wholesalers strongly tend to the undue enhancement of anthracite prices, an even more significant and equally objectionable cause of high prices is found in the exorbitant prices charged by some of the producers.

"Among these producers there is a very wide variation in the prices of coal at the mine, as shown by the reports made by the wholesalers to the Commission. The following tabulation shows for premium coal the proportion of carloads at different prices paid by wholesalers, for purchases from operators f.o.b. mine, for the week ending Oct. 6, 1923:

Price Range per Ton, f.o.b. Mine	Per cent
$9.50-$9.99	6.7
10.00-10.99	45.5
11.00-11.99	13.8
12.00-12.99	33.4
13.00 and over	.6
Total	100.0

"With respect to such premium coal, the reports obtained from wholesalers show that they paid in excess of $11 per ton for nearly 48 per cent of the prepared sizes of anthracite purchased directly from a producer, and over $12 per ton for more than one-third of such purchases.

"While the Commission has not yet made inquiry from the mine operators regarding their selling prices and cannot state, therefore, the proportion of high-priced or premium coal sold by all operators, it is a matter of common report that some of the larger companies are charging from about $8.75 to $9.25 per ton f.o.b. mine for domestic sizes, while other companies, as shown above, are sometimes charging over $13.

"Such wide differences in prices in the present period of normal operation of the mines are neither reasonable nor necessary, and often become the cause, but still more often the excuse, for the excessive prices now being extensively charged to the consumer."

With respect to gross profits or margins of wholesalers, the report says that for each of the weeks ending Sept. 29 and Oct. 8 the number of cars of anthracite of domestic sizes reported as having been sold at $10 or more per ton for nut and larger sizes, and $8 a ton for pea coal, was more than double the number reported for the week ending Sept. 22. The Commission declares this increase was due primarily to the larger volume of coal handled after the resumption of mining following the strike.

"As stated in the previous report," says the Commission, "there was a marked tendency for wholesalers to add 25c., 50c., 75c. or $1 per ton to the price paid for coal handled, more often than to add intermediate amounts. There was, however, a tendency for the percentage of sales on which 50c. or more per ton was added to decrease. At the present time 25c. appears generally to be regarded as a reasonable amount per ton to be added by wholesalers regularly handling company coal.

"For the week ending Sept. 22 wholesalers added 50c. or more per ton to the price on 66 per cent of all car sizes reported. During the following week the percentage on which 50c. or more per ton was added decreased to 47 per cent, and during the week ending Oct. 6 it dropped to 38 per cent.

"With the falling off in sales at high margins, there were decided increases in the number of sales made at a spread of 25c. per ton. Sales at a 25c. spread represented 31 per cent of the total for the week ending Sept. 22, and nearly 43 per cent for the week ending Oct. 6. The general tendency shown is for the high speculative margins taken on domestic sizes during the week ended Sept. 22 to decrease as the anthracite mines resume production, as the panic demand of consumers and retailers for coal at any price subsides somewhat and as effective publicity is given to the facts.

"Sales of steam sizes, which wholesalers are requested to report irrespective of price, were made at margins markedly lower than those on high-priced domestic sizes. The bulk of sales of steam sizes in all three weeks were made at margins not exceeding 25c. a ton, with a small percentage of sales in each week made at purchase cost, or less than cost, to the wholesaler.

"The largest per ton loss reported during the three weeks was 55c. a ton on one car of steam coal. Such sales are frequently pointed out by wholesalers as a justification for high margins on domestic sizes. As affecting all sales of steam coal and high-priced sales of domestic sizes covered by reports to the Commission, however, they represent but six-tenths of 1 per cent of the sales reported for the week ended Sept. 22; only 1.5 per cent for the week ended Sept. 29, and 3.9 per cent for the week ended Oct. 6. Losses on such a small percentage of total sales cannot justly be used as an excuse for the high margins taken on domestic sizes."

Coke Output in 1922 Lowest of Any Year Except One Since 1911

Total output of coke in 1922, according to final statistical returns by the Geological Survey, was 37,124,012 net tons, comprising 28,550,545 tons of byproduct and 8,573,467 tons of beehive. Preliminary estimates made in February were substantiated by the final returns from producers. Except in 1921, when business was extremely depressed, each year since 1911 has witnessed a larger total output of coke than 1922. The production of beehive coke was the smallest since 1888, except that in 1921. The output of byproduct coke, however, was the largest recorded since the beginning of the industry, except only that in 1920. As compared with 1920, the last normal year, 1922 showed decreases of 29 per cent in the total production of coke, 8 per cent in byproduct coke and 58 per cent in beehive coke.

Byproduct coke continued to exceed beehive coke in quantity, as it has since 1918. Only 23 per cent of the total came from beehive ovens in 1922, against 22 per cent in 1921 and 40 per cent in 1920.

SALIENT FIGURES OF THE COKE INDUSTRY IN 1922

	Beehive	Byproduct	Totals
Ovens in existence Dec. 31, 1922	63,957	11,212	75,169
Daily capacity (net tons of coke)	107,418	119,898	227,316
Coal charged into ovens (net tons)	13,285,868	41,052,670	54,338,538
Value of coal charged into ovens	$35,082,804	$194,015,725	$229,098,529
Coke produced (net tons)	8,573,467	28,550,545	37,124,012
Value of coke produced	$50,036,556	$188,276,767	$238,313,323
Average yield of coke from coal (per cent)	64.5	69.5	68.3
Coke used by producer (net tons)	1,071,886	21,106,823	22,178,709
Furnace coke sold (net tons)	6,105,003	2,934,924	9,039,927
Value of furnace coke sold	$33,724,440	$20,636,494	$54,360,934
Foundry coke sold (net tons)	1,164,716	1,601,733	2,766,449
Value of foundry coke sold	$8,334,400	$15,921,431	$24,255,831
Domestic and other coke sold (net tons)	179,670	3,865,751	4,045,421
Value of domestic and other coke sold	$1,086,014	$34,407,054	$35,493,068
Screenings and breeze:			
Produced (net tons)	83,917	2,395,286	2,479,203
Sold: Quantity (net tons)	41,533	526,157	567,690
Value	$132,448	$1,583,399	$1,715,847

The trend of production during the year, as shown by the monthly output, was in the main upward. The year opened with the rate of production higher than in 1921, but nevertheless abnormally low. Production of beehive coke increased from January to March and then slumped during the coal strike. Beginning in October, a rapid rise brought the rate at the end of the year to nearly two and one-half times that at the beginning. Production of byproduct coke declined slightly in February and then gained gradually through June, despite the coal strike. It slumped again in July and reached a low point in September, but increased to unprecedented quantities in November and December.

The following final figures of the production of coke by months are based on complete returns from coke manufacturers. They are somewhat greater than the preliminary

estimates issued currently during the year, which were based on railroad records of shipments.

MONTHLY PRODUCTION OF BEEHIVE AND BYPRODUCT COKE, 1922

(In Net Tons)

Month	Beehive	Byproduct	Totals
January	529,000	1,886,000	2,415,000
February	586,000	1,800,000	2,386,000
March	781,000	2,137,000	2,918,000
April	564,000	2,206,000	2,770,000
May	465,000	2,544,000	3,009,000
June	491,000	2,594,000	3,085,000
July	476,000	2,501,000	2,977,000
August	567,000	1,822,000	2,389,000
September	649,000	2,249,000	2,898,000
October	935,000	2,812,000	3,747,000
November	1,214,000	2,931,000	4,145,000
December	1,316,000	3,069,000	4,385,000
Totals	8,573,000	28,551,000	37,124,000

The value of all the important byproducts from coke-oven operations recovered and sold during 1922 was $83,387,763. This amount, however, does not represent the total value of all byproducts, as a large part of them, particularly the gas, was used in the plants where manufactured. The following table summarizes the total production and sales of these byproducts. The quantities given are smaller than appeared probable from the quantity of coke reported to the Survey currently during 1922, and the estimates prepared early this year were therefore higher than these final figures.

BYPRODUCTS OBTAINED FROM COKE-OVEN OPERATIONS IN 1922

Product	Unit	Production	Sales: Quantity	Sales: Value: Total	Sales: Value: Average
Tar	Gallons	327,779,734	162,204,417	$6,419,743	$0.0396
Ammonia:					
Sulphate	Lb.	695,543,349	714,752,882	17,818,236	0.0249
Ammonia liquor (NH_3 content)	Lb.	50,036,646	48,523,937	4,559,535	0.0940
Other forms (NH_3 content)	Lb.	693,782	192,549	12,041	0.0625
		.....	.....	22,389,812	.....
Sulphate equivalent of all forms	Lb.	898,465,061	909,618,826	.....	.....
Gas:					
Used under boilers, etc.	M.cu.ft.		19,123,814	1,251,325	0.0654
Used in steel or affiliated plants	M.cu.ft.	a442,671,114	144,976,030	15,942,446	0.1100
Distributed through city mains	M.cu.ft.		56,930,253	20,326,648	0.3570
Sold for industrial use	M.cu.ft.		10,352,921	1,104,096	0.1066
			231,383,018	38,624,515	0.1669
Light oil and derivatives:					
Crude light oil	Gallons	b101,437,555	5,138,095	630,768	0.1228
Benzol, crude	Gallons	2,666,177	2,665,889	698,437	0.2620
Benzol refined	Gallons	10,419,504	9,590,459	2,736,944	0.2854
Motor benzol	Gallons	57,025,699	54,930,203	10,491,309	0.1910
Toluol, crude	Gallons	38,159	3,938	652	0.1656
Toluol refined	Gallons	1,955,119	1,906,122	556,363	0.2919
Solvent naphtha	Gallons	2,983,858	2,861,482	538,512	0.1882
Other light oil products	Gallons	580,058	212,712	14,949	0.0703
		75,668,574	77,308,900	15,667,934	0.2027
Naphthalene:					
Crude	Lb.	6,107,742	3,298,851	52,103	0.0158
Refined	Lb.	1,810,972	1,589,084	79,149	0.0498
		7,918,714	4,887,935	131,252	0.0269
Other Products	.....	.....	.....	154,507	.....
Value of all byproducts sold				$83,387,763	

a Includes gas wasted and gas used for heating retorts.
b Of this amount 98,432,100 gallons was refined on the premises to make the derived products listed.
Statistics compiled by H. L. Bennit, Geological Survey, Washington, D. C., Aug. 31, 1923.

THE NATIONAL RETAIL COAL DEALERS' ASSOCIATION has named S. B. Crowell, president of the association; M. E. Keig, of the Consumers Coal Co., Chicago, and Roderick Stephens, of New York, to represent the association on an advisory committee of fifteen to co-operate with the Department of Commerce in coal matters. The National Coal Association, the American Wholesale Coal Association, the Anthracite Operators' Policy Committee and the American Railway Association also are to appoint three members each to the committee.

Mine Workers in Southeastern Kentucky Take Wage Cuts to Avert Shutdowns

CHICAGO, Ill., Oct. 29.—Cutting wages back 20 per cent, or to the 1917 scale, is spreading through parts of non-union southeastern Kentucky, especially in Bell County. A number of the lesser operations are reported already on the low scale, operators saying that miners have approved of the cut as preferable to mine shutdowns. The cut is not general nor uniform and is discouraged by such operator groups as the Hazard Coal Operators' Exchange, which met Saturday at Lexington, Ky. Observers declare that in spite of official opposition the reduction is going to reach up into northeastern Kentucky before long by the action of "weak sisters" among mine owners. Low prices and no market are responsible. The miners' union is making a special effort to organize the region.

Springfield to St. Joseph Rate Cut

Lower rates on coal from the Springfield district of Illinois to St. Joseph, Mo., have been prescribed by the Interstate Commerce Commission. The rates from mines on the Alton and the Wabash in the Springfield district are held to be prejudicial to the extent that they exceed by more than 40c. per net ton the rate contemporaneously maintained by these roads to Kansas City. Great interest in this case was evinced by the Southwestern Interstate Coal Operators' Association, the Fifth and Ninth Districts Coal Bureau, by the Kansas City Power & Light Co. and by the Central Illinois Coal Traffic Bureau. There is keen competition between Kansas City and St. Joseph for the location of industries and business enterprises. The freight rate on coal has an important bearing on this situation. Operators in the southern Illinois fields opposed reductions from the Springfield district, without securing a corresponding reduction in the rate from other Illinois fields. Operators in the Kansas, Missouri, Oklahoma and Arkansas districts opposed any reduction unless it should apply also to the Southwestern coal field. These operators contend that they already have lost much business in Kansas City to the Springfield district because of the former reduction and they contended that their coal would be displaced at St. Joseph by this reduction.

THE COAL, COKE & IRON ORE COMMITTEE, CENTRAL FREIGHT ASSOCIATION TERRITORY, announces a hearing Nov. 8, at 10 a.m., at room 606, Chamber of Commerce Building, Pittsburgh, Pa., to consider the proposed cancellation of proportional rates on bituminous coal in carload lots from mines in Ohio and the Inner and Outer Crescents of Pennsylvania, Virginia, West Virginia, etc., to upper Mississippi River crossings, for beyond. The committee also will hold a hearing at the same time and place on the proposed cancellation of rates on coke (except petroleum, creosote and tar or pitch coke), coke breeze, coke dust and coke screenings, in carload lots, from ovens on the Chesapeake & Ohio Ry. in the New River, Kanawha, Kentucky and Big Sandy districts, to stations in Ontario and Nova Scotia—i. e., Amherst, N. S.; Owen Sound, Sudbury, Copper Cliff, Victoria Mine, Sault St. Marie and Worthington, Ont.

AT A RECENT MEETING on standardization of anthracite sizes of subcommittee IV of Committee D5 on Coal and Coke, American Society for Testing Materials, held at the office of Hubb Bell, chairman, it was decided tentatively to adopt the following sized screens for anthracite, and to submit the same to producers for their action: Broken, through 4½ in., over 3¼ in.; egg, through 3¼, over 2⅜; stove, through 2⅜, over 1⅛; chestnut, through 1⅛, over ⅞; pea, through ⅞, over ½; buckwheat, through ½, over ¼; rice, through ¼, over 5/32; barley, through 5/32, over 3/32 or 1/16; culm, through 3/32 or 1/16 in.

I. C. C. Likely to Modify Ruling on Private Cars; Railroads Make Poor Case

Lacking New Evidence, Carriers Reiterate Old Arguments—Personal Opinions but No Facts or Figures Presented—Commission Points Out That Case Involves Transportation, Not Merchandising, Problems

By Paul Wooton
Washington Correspondent of *Coal Age*

Judging from questions asked and from the attitude of the members during the rehearing of the assigned-car case, there is some likelihood that the Commission will modify its recent opinion so as to grant a concession to the owners of private cars. It also is regarded as probable that the Commission will defer the effective date of its order from Dec. 1 to Jan. 1. It is the consensus of opinion that no change will be made in that portion of the opinion affecting the preferential use of cars for the procurement of railroad fuel.

The railroads have made a particularly poor case. Even the Chesapeake & Ohio, which clamored loudest for a rehearing of the case, failed to bring in a scintilla of new matter. Railroad witnesses generally simply reiterated arguments which had been presented at the former hearing. Boiled down, the substance of their arguments is that assigned cars are necessary to insure the railroads with a continuous supply of the type of coal best adapted for locomotive purposes. Their statements, however, were presented as personal opinions, and no convincing facts and few figures were presented in the effort to substantiate the statements. Many of the railroad witnesses were purchasing agents or those concerned with the use of fuel. Members of the Commission pointed out repeatedly that the case presents transportation and not merchandising problems.

When the railroads announced, after having presented only perfunctory testimony, that they had completed their case, those in attendance were astounded. No explanation is forthcoming as to why they asked that the case be reopened when they had no new evidence to present. Even Commissioner Aitchison admonished the railroads that a new opportunity had been afforded them to present evidence and urged them to present it if they had it.

Railroads Overconfident at First Hearing

It is believed the granting of the rehearing was influenced in no small degree by a feeling on the part of members of the Commission that the railroads had been overconfident during the first hearing. It was assumed that the railroads took it for granted that the Commission would not abolish assigned cars and as a consequence did not make a determined effort to present arguments in favor of the continuance of their use. The showing during the rehearing, however, indicates that the railroads are not in a position to substantiate the claims they have been making in this particular.

That the desire on the part of the railroads to continue assigned cars was actuated more by the better prices they could obtain by furnishing full car supply to the mines with which they had contracts, was emphasized in an amusing way during the hearing. One of the witnesses was making certain points contained in a letter written by an official of the Frisco lines. Opposing counsel happened to ask to see the letter. The witness showed disinclination to comply with the request. Finally he tendered the first page of it. He was asked for the remainder of the letter, which he declined to hand over. Commissioner Aitchison was called upon to rule on the matter. He held that it had been the practice of the Commission to allow opposing counsel to consult a full document when extracts only were being presented. When, under that ruling, the whole letter was passed over, it was found that the railroad official had emphasized the need for assigned cars because of the effective way in which they could be used to obtain lower prices for coal.

The arguments made by the railroads as to the strides they are making in operating efficiency failed to square with those which were presented at this hearing to indicate the inability of the roads to obtain ample fuel without a preferential car supply. Another interesting point brought out was the large acreage of undeveloped coal mines owned by railroads. The New York Central alone, it was testified, owns 100,000 acres of potential coal lands.

Another point which can be deduced from the testimony is the comparatively small amount of coal which moves in private cars during the period when there is any stringency in car supply. The total probably does not reach 10,000,000 tons on an annual basis, an insignificant amount when compared with the total yearly movement.

Disclaim Desire for Preferential Treatment

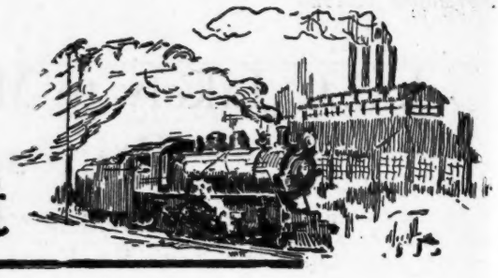
Those arguing for private cars disclaim any intention of desiring preferential movement or placement. They ask, however, that they be allowed to use these cars during a period of car shortage, provided the railroads have adequate motive power, terminal facilities and other means of handling them without prejudice to shippers who use system cars. It is this amendment which the Commission is thought likely to embody in an amended opinion. The argument against such a concession is that it would be difficult to determine just when the supply of motive power is adequate and just when terminal or junction facilities are sufficiently open to handle the excess of cars. The policing of such a regulation would be difficult especially when the natural tendency on the part of the carrier would be to take on all tonnage offered. It is argued further that even an impartial judge would have a highly technical and delicate question to decide just when the use of private cars would not constitute a discrimination against the shipper in system cars.

Private Cars Have Indirect Benefit

The point was emphasized by witnesses on behalf of the owners of private cars that the advantages of their use is an indirect one. Their actual operation results in a loss. For that reason it is contended by those opposing private cars that the advantages are sufficient to justify the continuance of their use even were the decision of the Commission to stand in its present form. There will be no trend, it is contended, to sell these private cars, so that they will not be forced on to a market in which there is only one bidder.

The fact that Commissioner Aitchison assured an intending buyer of private coal cars that he had at that time no reason to believe the policy toward them would be changed carries with it no moral obligation on the part of the Commission, it is contended. One man frequently asks another as to the advisability of purchasing a certain stock. The intending purchaser may act on the opinion and buy. Subsequently the price of the stock may fall, causing a loss to the purchaser. Such incidents are daily occurrences, but there is no thought that the man who proffered his best judgment should share any portion of the loss. It is held that all Commissioner Aitchison did, in an effort to be helpful and friendly, was to give his inquirer the benefit of his judgment.

Production and the Market



Weekly Review

Production of soft coal continues in excess of consumption and the market is indifferent. The demand for storage coal is falling off and buyers with contracts are slowing up receipts. Some large operators have reduced contract prices in an effort to keep their coal on the move and mines going.

The increase in production of soft coal recorded for the second week in October was only temporary, the report of the Geological Survey showing that the output in the week ended Oct. 20 was 10,675,000 net tons, a decline of 278,000 net tons from the week ended Oct. 13 and 24,000 tons less than in the week ended Oct. 6. A further decline is indicated for last week. Complete returns show that the production of soft coal in September was 42,216,000 net tons, a decrease of 2,648,000 tons when compared with August.

Prices for soft coal continue to move downward, *Coal Age* Index registering 184 on Oct. 29, a drop of two points from the previous week. The average price was $2.23. Increases in southern Illinois, Springfield, western Kentucky, Clearfield. Cambria and Somerset coals were offset by declines in Standard, southeastern Kentucky, Pittsburgh, Kanawha and Pocahontas coals.

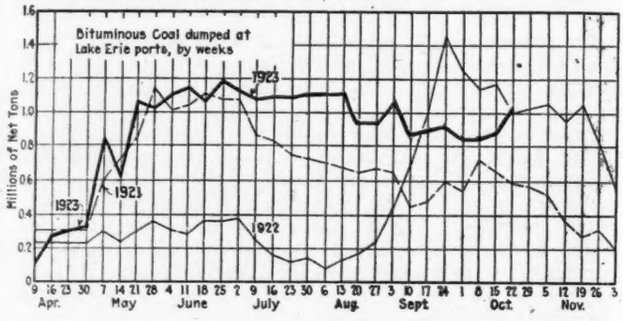
Production Limited by Demand

Lack of demand is the dominant factor in limiting production. In the Middle West the trade was aroused by a change in temperatures which created a slightly better demand for domestic coal. Steam coals continue hard to move. In St. Louis the market is quiet with the cheaper domestic coals in better demand than the better grades. No indication of improvement is seen in New England, where reserve coals are piling up and Pennsylvania coals move slowly.

In Ohio there was a slight upturn in domestic coals but there is no activity in the steam situation, users of these coals having from four to six weeks' supply on hand. Not so much coal moved in the Pittsburgh district at the extreme low prices, giving the indication that the market now is in a slightly better condition.

Heavy buying of Welsh anthracite is reported, orders aggregating about 140,000 tons, nearly all of which is for Boston delivery, having been placed last week with Welsh mine operators and exporters.

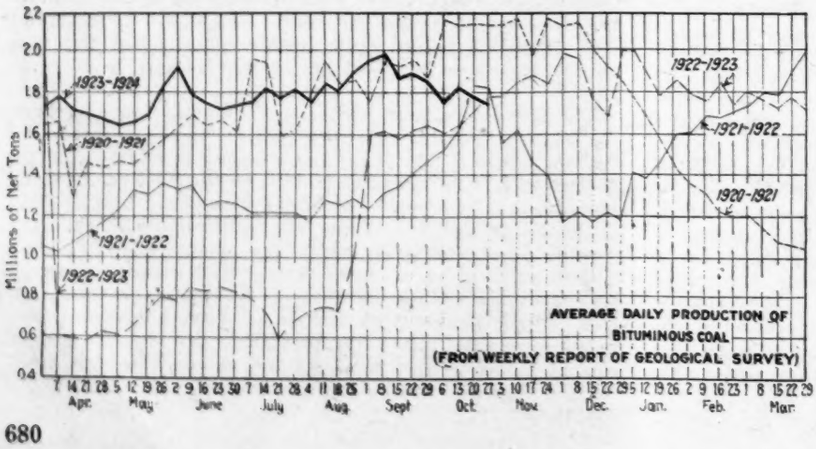
Lake dumpings of soft coal increased during the week ended Oct. 22 to more than 1,000,000 net tons for both cargo and fuel coal.



	Week Ended Oct. 22	Season to Oct. 22
Cargo	955,551	24,571,917
Fuel	54,571	1,340,969
Totals	1,010,122	25,912,886

Production of anthracite is nearly up to capacity, 2,045,000 net tons having been mined during the week ended Oct. 20, an increase of 36,000 tons when compared with the previous week. Due to observance of Mitchell Day, Oct. 29, by the mine workers output will show a decrease this week. Brisk demand for the domestic sizes continues, with stove and chestnut leading. Egg, pea and buckwheat are accumulating on the Duluth docks, stove and chestnut sizes moving rapidly.

There is little activity in the export market. Some orders were placed but the tonnage was small. At Hampton Roads, dumpings during the week ended



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Oct. 6	9,736,000	10,699,000
Oct. 13 (a)	10,110,000	10,953,000
Oct. 20 (b)	10,378,000	10,675,000
Daily average	1,730,000	1,779,000
Calendar year	301,239,000	445,801,000
Daily av. cal. year	1,211,000	1,796,000
ANTHRACITE		
Oct. 6	1,994,000	2,015,000
Oct. 13	2,112,000	2,009,000
Oct. 20	2,039,000	2,045,000
COKE		
Oct. 13 (b)	185,000	284,000
Oct. 20 (a)	210,000	276,000
Calendar year	5,354,000	15,374,000

(a) Subject to revision. (b) Revised from last report.

Oct. 25 were 259,158 net tons, as compared with 274,854 tons dumped the previous week, the decrease in shipments to New England and other coastwise points accounting largely for the decline.

Middle West on Slow Upturn

Although Illinois and Indiana mines are working less than half time—many mines a good deal less than that—and, although production has not taken a marked turn for the better, yet domestic demand all around is stablizing, prices fluctuate less and less from circular levels and there is a slightly better tone to Midwest coal trading. A little cooler weather had an effect on the market. Good southern Illinois lump brings close up to the circular of $4.35 everywhere but in great centers like Chicago, where quotations must be shaved down to $3.90 or thereabouts. Central Illinois is moving about all its 6-in. lump output at the circular price of $3.25, profiting over southern Illinois in many markets by reason of both a favorable freight rate and the wide difference in price.

Indiana is having a little more trouble maintaining its circulars, but there, too, big lump is showing slight signs of activity. In all fields the middle sizes—egg and nut—are sluggish. Screenings, however, have not been backing up much on the mines even though in most regions less-than-a-dollar prices have practically disappeared. Big buyers of steam coal are inclined to hold out waiting for a drop in screenings when lump demand becomes lively with cold weather.

St. Louis Is Sluggish

Conditions in St. Louis continue quiet. There is little domestic demand and it is for cheaper grades of coal, there being little call for Franklin County and practically none for anthracite, smokeless or coke. Dealers are all loaded up and little is doing in wholesale business. Country trade is somewhat similar, although it is good in spots. Carload steam is unusually slow, but wagonload keeps up fairly good. Country steam is not a factor in St. Louis. A little is moving to the Omaha, Minneapolis and Chicago markets.

Reports from the Carterville field show that there is a further curtailment of production on account of no market and mines continue to suspend operations. All mines have

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Oct. 30 1922	Oct. 15 1923	Oct. 22 1923	Oct. 29 1923†
Smokeless lump	Columbus	$6.60	$6.35	$6.35	*$5.75@$6.00*
Smokeless mine run	Columbus	6.25	3.05	3.05	*2.00@ 2.65*
Smokeless screenings	Columbus	5.85	2.25	1.35	1.25@ 1.50
Smokeless lump	Chicago	6.35	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	5.75	2.85	2.85	2.75@ 3.00
Smokeless lump	Cincinnati	7.00	5.85	5.85	5.75@ 6.00
Smokeless mine run	Cincinnati	6.10	2.50	2.50	2.00@ 3.00
Smokeless screenings	Cincinnati	6.10	1.60	1.75	*1.00@ 2.00*
*Smokeless mine run	Boston	7.10	4.65	4.55	*4.35@ 4.50*
Clearfield mine run	Boston	3.50	2.00	1.95	**1.50@ 2.50**
Cambria mine run	Boston	4.10	2.60	2.50	**2.25@ 3.00**
Somerset mine run	Boston	3.75	2.35	2.25	1.75@ 2.75
Pool 1 (Navy Standard)	New York	4.85	3.10	3.05	2.85@ 3.25
Pool 1 (Navy Standard)	Philadelphia	.....	3.15	3.15	*3.00@ 3.25*
Pool 1 (Navy Standard)	Baltimore	.....	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	4.25	2.35	2.35	*2.10@ 2.50*
Pool 9 (Super. Low Vol.)	Philadelphia	4.30	2.45	2.45	*2.25@ 2.50*
Pool 9 (Super. Low Vol.)	Baltimore	4.00	2.25	2.15	2.15
Pool 10 (H.Gr.Low Vol.)	New York	3.50	2.05	2.05	*1.85@ 2.25*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	3.50	2.05	2.00	*1.80@ 2.05*
Pool 10 (H.Gr.Low Vol.)	Baltimore	3.35	2.15	2.10	2.10
Pool 11 (Low Vol.)	New York	3.05	1.85	1.85	*1.60@ 1.90*
Pool 11 (Low Vol.)	Philadelphia	3.15	1.75	1.70	*1.55@ 1.70*
Pool 11 (Low Vol.)	Baltimore	3.25	1.80	1.90	1.80@ 2.00
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	3.30	1.65	1.60	1.50@ 1.75
Pool 54-64 (Gas and St.)	Philadelphia	3.50	1.65	1.60	1.50@ 1.75
Pool 54-64 (Gas and St.)	Baltimore	3.35	1.75	1.75	1.75
Pittsburgh sc'd gas	Pittsburgh	5.00	2.55	2.55	2.50@ 2.60
Pittsburgh gas mine run	Pittsburgh	.....	2.20	2.25	2.20@ 2.30
Pittsburgh mine run (St.)	Pittsburgh	3.25	1.85	1.85	**1.85@ 2.00**
Pittsburgh slack (Gas)	Pittsburgh	3.60	1.20	1.20	*1.00@ 1.15*
Kanawha lump	Columbus	6.25	3.15	3.15	2.85@ 3.50
Kanawha mine run	Columbus	4.75	1.85	1.85	1.75@ 2.00
Kanawha screenings	Columbus	4.10	.95	.90	.80@ 1.00
W. Va. lump	Cincinnati	6.00	3.35	3.50	*3.00@ 3.75*
W. Va. Gas mine run	Cincinnati	4.35	1.65	1.60	*1.25@ 1.75*
W. Va. Steam mine run	Cincinnati	4.10	1.65	1.60	*1.25@ 1.75*
W. Va. screenings	Cincinnati	4.00	.80	1.00	*.50@ 1.00*
Hocking lump	Columbus	4.50	3.05	3.05	2.85@ 3.25
Hocking mine run	Columbus	3.60	1.85	1.85	1.75@ 2.00
Hocking screenings	Columbus	3.10	.95	.90	*.75@ 1.00*
Pitts. No. 8 lump	Cleveland	3.81	2.55	2.60	*2.10@ 3.00*
Pitts. No. 8 mine run	Cleveland	3.56	1.90	1.85	1.80@ 1.90
Pitts. No. 8 screenings	Cleveland	3.31	1.05	1.00	*.80@ 1.00*

Midwest	Market Quoted	Oct. 30 1922	Oct. 15 1923	Oct. 22 1923	Oct. 29 1923†
Franklin, Ill. lump	Chicago	$5.35	$4.05	$4.10	$3.90@$4.35
Franklin, Ill. mine run	Chicago	4.10	2.60	2.60	2.25@ 3.00
Franklin, Ill. screenings	Chicago	2.60	1.35	1.45	1.40@ 1.50
Central, Ill. lump	Chicago	5.00	3.10	3.10	3.00@ 3.25
Central, Ill. mine run	Chicago	3.10	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	1.85	.80	.90	**.90@ 1.20**
Ind. 4th Vein lump	Chicago	5.10	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	3.85	2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings	Chicago	2.35	1.20	1.20	1.15@ 1.30
Ind. 5th Vein lump	Chicago	4.75	2.50	2.50	2.25@ 2.75
Ind. 5th Vein mine run	Chicago	3.65	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	2.10	.80	.80	.75@ .90
Mt. Olive lump	St. Louis	.....	3.10	3.10	3.00@ 3.25
Mt. Olive mine run	St. Louis	.....	2.25	2.25	2.20@ 2.30
Mt.Olive screenings	St. Louis	.....	1.25	1.25	1.20@ 1.30
Standard lump	St. Louis	4.25	3.00	3.10	*2.90@ 3.25*
Standard mine run	St. Louis	2.60	2.05	2.05	1.80@ 2.30
Standard screenings	St. Louis	2.00	.55	.50	*.40@ .50*
West Ky. lump	Louisville	5.00	2.55	2.40	2.35@ 2.50
West Ky. mine run	Louisville	2.80	1.75	1.65	1.50@ 1.85
West Ky. screenings	Louisville	2.00	.55	.50	.45@ .60
West Ky. lump	Chicago	4.10	2.60	2.60	2.50@ 2.75
West Ky. mine run	Chicago	3.10	1.75	1.75	1.50@ 2.00
South and Southwest					
Big Seam lump	Birmingham	3.95	3.75	3.75	3.65@ 3.90
Big Seam mine run	Birmingham	2.60	1.95	1.95	1.75@ 2.15
Big Seam (washed)	Birmingham	2.75	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	5.50	3.35	3.00	2.75@ 3.25
S. E. Ky. mine run	Chicago	4.25	2.25	2.25	2.00@ 2.50
S. E. Ky. lump	Louisville	6.75	3.10	3.00	2.75@ 3.25
S. E. Ky. mine run	Louisville	4.00	2.00	1.75	1.50@ 2.00
S. E. Ky. screenings	Louisville	4.10	.85	.80	.70@ .85
S. E. Ky. lump	Cincinnati	5.85	3.10	3.55	*3.00@ 3.75*
S. E. Ky. mine run	Cincinnati	4.25	1.55	1.55	*1.25@ 1.75*
S. E. Ky. screenings	Cincinnati	4.00	.80	.90	*.50@ 1.00*
Kansas lump	Kansas City	5.75	5.00	5.00	5.00
Kansas mine run	Kansas City	3.75	3.50	3.50	3.50
Kansas screenings	Kansas City	2.50	2.25	2.25	2.25

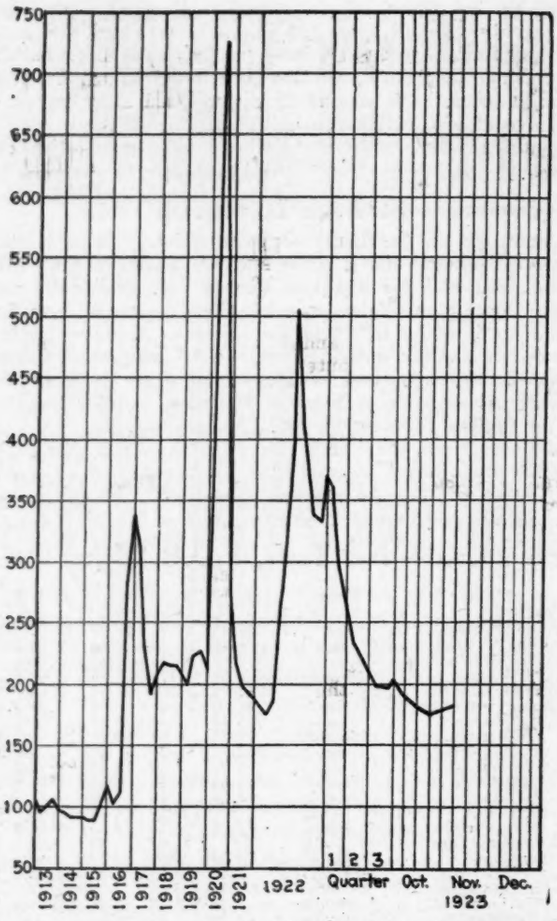
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1922 Independent	Dec. 26, 1922 Company	Oct. 22, 1923 Independent	Oct. 22, 1923 Company	Oct. 29, 1923† Independent	Oct. 29, 1923† Company
Broken	New York	$2.34	$9.00	$7.75@$8.25	$9.60	$8.00@$9.25	$9.60@10.50	$8.00@$9.25
Broken	Philadelphia	2.39	.....	7.90@ 8.10	.....	.....	.....	.....
Egg	New York	2.34	9.25@12.00	8.00@ 8.35	9.85@12.25	8.75@ 9.25	9.85@12.25	8.75@ 9.25
Egg	Philadelphia	2.39	9.25@11.00	8.10@ 8.35	9.85@12.20	8.75@ 9.25	9.85@12.20	8.75@ 9.25
Egg	Chicago*	5.06	12.50@13.00	7.20@ 8.25	9.60@12.50	8.00@ 8.35	9.60@12.50	8.00@ 8.35
Stove	New York	2.34	9.25@12.00	8.00@ 8.35	9.85@12.25	8.75@ 9.25	9.85@12.25	8.75@ 9.25
Stove	Philadelphia	2.39	9.25@11.00	8.15@ 8.35	9.85@12.20	8.90@ 9.25	9.85@12.20	8.90@ 9.25
Stove	Chicago*	5.06	12.50@13.00	7.35@ 8.25	9.60@12.50	8.00@ 8.35	9.60@12.50	8.00@ 8.35
Chestnut	New York	2.34	9.25@12.00	8.00@ 8.35	9.85@12.25	8.75@ 9.25	9.85@12.25	8.75@ 9.25
Chestnut	Philadelphia	2.39	9.25@11.00	8.15@ 8.35	9.85@12.20	8.90@ 9.25	9.85@12.20	8.90@ 9.25
Chestnut	Chicago*	5.06	12.50@13.00	7.35@ 8.35	9.60@12.50	8.00@ 8.35	9.60@12.50	8.00@ 8.35
Ranges	New York	2.34	.....	8.25	.....	9.00	.....	9.00
Pea	New York	2.22	7.00@11.00	6.15@ 6.30	6.75@ 8.25	6.15@ 6.65	6.75@ 8.25	6.15@ 6.65
Pea	Philadelphia	2.14	7.00@ 8.00	6.15@ 6.20	6.75@ 9.00	6.35@ 6.60	6.75@ 9.00	6.35@ 6.60
Pea	Chicago*	4.79	7.00@ 8.00	5.49@ 6.03	6.00@ 6.75	5.40@ 6.05	6.00@ 6.75	5.40@ 6.05
Buckwheat No. 1	New York	2.22	4.00@ 5.00	4.00@ 4.10	2.50@ 3.50	3.50	2.25@ 3.00	3.50
Buckwheat No. 1	Philadelphia	2.14	5.00	4.00	3.00@ 3.50	3.50	3.00@ 3.50	3.50
Rice	New York	2.22	3.00@ 3.25	2.75@ 3.00	1.85@ 2.50	2.50	*1.75@ 2.15*	2.50
Rice	Philadelphia	2.14	2.50@ 2.75	2.75@ 3.00	2.00@ 2.50	2.50	2.00@ 2.50	2.50
Barley	New York	2.22	1.75@ 2.00	1.50@ 2.00	1.15@ 1.50	1.50	*1.00@ 1.50*	1.50
Barley	Philadelphia	2.14	1.00@ 1.75	2.00	1.25@ 1.50	1.50	1.25@ 1.50	1.50
Birdseye	New York	2.22	.....	2.10	.....	1.60	.....	1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923			1922
	Oct. 29	Oct. 22	Oct. 15	Oct. 30
Index	184	186	185	346
Weighted average price	$2.23	$2.25	$2.24	$4.19

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally, shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

no bills on track and some of them seem unable to move any coal at all. Railroad tonnage continues light. The situation in the DuQuoin and Jackson County field is bad.

In the Mt. Olive district things are in a bad way. One mine of the Consolidated Coal Co. at Mt. Olive worked Oct. 5 and not again until the 24th, on account of failure to move the no-bills and scarcity of cars on the Wabash. On the Litchfield & Madison R.R. conditions are extremely bad on account of no cars. In the Standard field, mines are shutting down, there being no market for any size and several working mines are selling coal at a loss. A careful survey of the fields shows that some mines are having a hard time meeting payrolls.

Kentucky Is Stirring

Cold weather throughout the Central West with snow reported in some localities has created a better demand for prepared sizes, and Louisville jobbers and sales offices of mining companies report fair business on prepared coal, some houses showing increased sales over the earlier season, but business is being done on a narrow margin by brokers as well as operators due to the competition for business, good car supply and low prices. Screenings are made in great volume and have to move at give-away prices.

If statements from eastern Kentucky are correct relative to non-union mines cutting back to the 1917 wage-scale basis, the outlook is poor for union mines in western Kentucky. About the only thing to brighten the outlook is that when the Lake and Northwest trade is supplied a lot of producers of prepared sizes will be forced to curtail, thus reducing overproduction of screenings. Right now there is practically no movement of mine-run, and that at very low prices. Some mine-run in distress has been reported selling at down around screenings prices over the past ten days, but it represented principally off grade stuff.

Practically no new mining ventures are under way in western Kentucky, there being one large stripper project under construction, but otherwise the field is at a standstill as regards development of new mines, although there has been a considerable amount of improvement at old mines to better fit them for supply prepared sizes.

Northwest Shipments Heavier

Shipment of all kinds of coal to the Northwest docks has been steadily on the increase lately, but demand throughout that region has not been stimulated much yet by the approach of winter. Bituminous markets are dull though hard coal and smokeless substitutes are in light demand continually. All-rail screenings in most regions, especially that around Minneapolis and St. Paul, are not so abundant. Stocks there are working off slowly and regular sizes are steadying a little in price.

Shipments to the Head-of-the-Lakes picked up during the week when forty-seven cargoes arrived. Of these eight were anthracite. Report of cargoes on the way from lower Lake ports shows that twenty-seven are coming up with three of hard coal included.

The Duluth market in bituminous is very dull. Everyone is playing a waiting game. Prices in bituminous remain unchanged, but there is every indication that the market will sag by the first of the year unless some spurt of buying commences. Reports of stocks on docks show 5,100,000 tons of soft and 150,000 tons of anthracite. This indicates that coal is piling up.

Increasing receipts by Lake is the only notable feature of the coal trade at Milwaukee. The October record will probably exceed that of any month since July. Receipts of anthracite aggregate 115,485 tons and soft coal 385,619 tons, making the season's receipts thus far 749,124 tons of the former and 2,470,963 tons of the latter. Both wholesale and retail markets are slow.

Cooler Weather Helps West

Cooler weather is having a slight effect on coal trade throughout the West and Southwest but nowhere is there real life to be observed. In Utah some operators assert that a partial shortage of cars is responsible for the short running time of the state, but generally it is admitted that market alone is responsible. Dealers are moving coal steadily, however, though industrial coal drags. In Colorado market improvement is noted, but it is small for this season of the year. Prices continue to bump bottom. Weakness in the demand for screenings is the main deterrent in the Southwest. The Kansas and Oklahoma lump market is fairly good but the mining regions are filling with no-bills of fine sizes.

Slight Upturn in Ohio Markets

Interest in the Cincinnati market is centered around a little upturn in inquiries following a touch of cooler weather. Domestic business was aroused slightly, turned over and then returned to the dragginess that has been noticeable for some time. Meanwhile the price on slack has been dropping and run-of-mine has been growing perceptibly weaker so far as day to day prices are concerned. The smokeless-coal situation continues practically unchanged. Prices of lump are being maintained while the prices for run of mine and slack has been governed in a high degree by the drop in high-volatile coals. For the first time in years sales of smokeless slack were reported around $1 to wholesale dealers.

Increased demand for domestic coals was noticed in the Columbus market, but steam business continues dull. All heavy consumers appear to be stocked, and fill out by pur-

chasing distress coal. Steam grades are a drug on the market. Utility and railroad requisitions are not as large as they were. Retailers are replenishing their stocks only as needed, and prices are steady.

Retail dealers in the Cleveland market are fairly well stocked, domestic consumers not buying until the coal is actually needed. Steam-coal users have from four to six weeks' supply of coal on hand. Offerings of distress coal are not large, many operators preferring to run their mines from three to four days a week rather than ship their product into the present market. Altogether the trade is not optimistic.

Reports received from 442 mines by the Southern Ohio Coal Exchange show that during the week ended Oct. 13 there was an output of 166,750 tons, while the eastern Ohio field produced 426,000 tons during the week ended Oct. 20.

While the Pittsburgh market is in bad shape it is possible that it is in a slightly better condition than a week or two ago in the matter of price. The full range of quotations is much the same, but in point of tonnage there is not as much going at the extreme low prices as there was. Production, however, is poorer and is decreasing. There is much speculation as to how the market will act when the Lake season ends. It is evident that consumers expect it to be easier, but prices may be too low to stand any further decline. There are some observers who think the market will counter the expectations and grow stronger at the end of the Lake season.

Production in central Pennsylvania is still on the decline. Some operations are working less than half time.

No Improvement Seen in New England

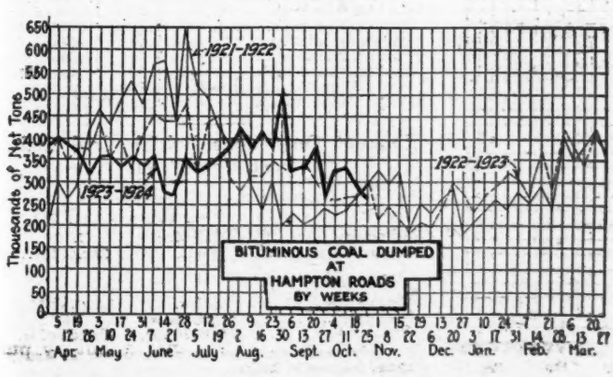
There are no indications of improvement in the New England steam trade. There is constant pressure on consumers to take coal, while reserves generally are nearly as great as in November, 1918. Market cargoes seem to be the rule, and due to heavy receipts by water the range of price on cars at this end is further depressed.

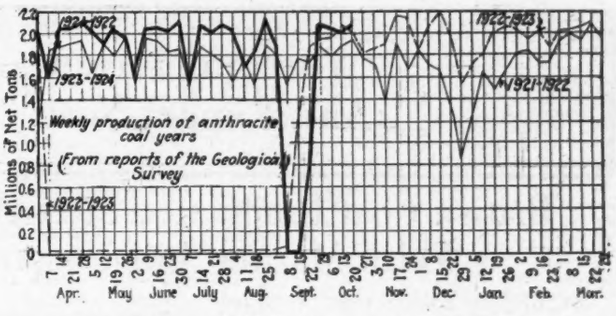
Pocahontas and New River, both No. 1 Navy standard and less choice coals, are selling down to $4.35 per gross ton f.o.b. Norfolk and Newport News. Prices on cars at Boston are correspondingly low; while some agencies are asking $6 there is at least one factor who is out for business at $5.50. Doubtless the latter figure is made to hold trade and does not mean that the same coal at the Virginia terminals is being sold on so low a basis.

In the territory within seventy-five miles of Boston or other tidewater distributing points there is practically nothing doing now on coal all-rail from central Pennsylvania. In that part of New England that is exclusively all-rail very low quotations are heard, but the aggregate tonnage is less than during the summer.

Seaboard Markets Sagging Further

Demand and prices continue on the downgrade in the New York soft-coal market. Bids received by the U. S. Shipping Board for delivering f.a.s. vessels that harbor 1,800 gross tons of either Pool 9 or Pool 71 coal resulted in tenders ranging from $4.18 to $5.25 per gross ton, or on a basis of $1.02 to $1.97 per net ton f.o.b. mine. Dumpings at the local piers during the first five days of last week averaged around 260 cars daily.


1921-1922
1922-1923
1923-1924
Thousands of Net Tons
BITUMINOUS COAL DUMPED AT HAMPTON ROADS BY WEEKS
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.



In Philadelphia demand is extremely light and some of the larger users seem content to depend at present on their storage piles. Contract holders are not taking their full requirements and are apparently buying at the present low spot prices. This tendency has grown to such an extent that several large producers have reduced their contract rate of $3.80 put into effect April 1 to $3.50, some of them making it retroactive to Oct. 1. This has had a tendency to push prices still further down the scale. The better grades are in best demand. The Baltimore market is more or less spasmodic. Wholesale dealers received many offers from operators, but buying is light.

There was little or no improvement noticed in the commercial coal market at Birmingham but domestic buying picked up slightly last week due to cooler weather. As a result mine orders that were suspended have been reinstated. Lump coal is retailing at from $7.50@$10 per ton.

The soft-coal market at Toronto is bad and there is practically no demand. Pennsylvania smokeless is being quoted at $7.20 delivered; steam lump, $7.65, and slack, $5.75.

Welsh Anthracite May Be Market Factor

Demand for anthracite domestic coals around New York and Philadelphia is centered chiefly around stove and chestnut, but both egg and pea are moving readily and without trouble. Most buyers find it easier to obtain the larger coals if they include in their order some steam size tonnage. While quotations in the New York market range as high as $12.50 for egg, stove and chestnut, very little coal of that price comes to that market, most of it going to New England and line points, while it is said that Canadian buyers are obtaining tonnages at quotations ranging as much as $1 less. The large companies and some independent operators are storing the steam coals. Demand for these coals is low and prices far below company schedules.

Dealers in Baltimore complain of the lack of stove coal and are pushing sales of egg, chestnut and pea as hard as possible.

The New England situation is expected to be greatly relieved by receipts of Welsh anthracite, orders aggregating nearly 140,000 tons having been placed last week with a Cardiff house at a price said to be around $12 c.i.f. Boston harbor. Other quotations for Welsh anthracite range as low as $11 c.i.f. Boston or New York harbor.

The market for hard coal in Toronto is brisk, and supplies are fair. Retail dealers are selling anthracite domestic sizes at $16 and are able to fill orders of reasonable size.

For the fourth consecutive week production of beehive coke declined and a new low weekly record for 1923 was established, says the Geological Survey. The total output for the week ended Oct. 20 amounted to 276,000 net tons, a decrease of 8,000 tons from the previous week, which was confined chiefly to Pennsylvania and Ohio. The Connellsville market is suffering from extreme lightness of demand.

Car Loadings, Surplusages and Shortages

	Cars Loaded — All Cars	Cars Loaded — Coal Cars
Week ended Oct. 13, 1923	1,084,458	194,963
Previous week	1,079,690	191,741
Same week in 1922	969,487	194,520

	Surplus Cars — All Cars	Surplus Cars — Coal Cars	Car Shortage	
Oct. 14, 1923	27,062	5,674	15,920	4,179
Same date in 1922	4,275	1,588		
Oct. 7, 1923	34,138	7,098	16,160	4,600

Foreign Market And Export News

British Coal Production at High Level; Welsh Market Still Unsettled

Great Britain's mines continue to produce large weekly tonnages, the output for the week ended Oct. 13 amounting to 5,625,000 tons, says a cable to *Coal Age*. This compares with 5,528,000 tons the previous week, and is the heaviest weekly production since June 16 of this year when it was 5,654,000 tons. It is 370,100 tons larger than the output for the week ended Oct. 14, 1922.

The Welsh coal market maintains its state of unsettlement. Stormy weather has involved serious tonnage delays and mine stoppages have become fairly frequent. Supplies are still pressing heavily on the market, and the excess over demand prevents improvement. France, Italy, Belgium, and South America are buying cautiously, the first three countries being influenced by the Ruhr situation, while coals are making competition in South America very keen.

Welsh operators are disappointed at not being given the contract for 150,000 tons for the Nord and Etat Railways of France. In some quarters the placing of this order in America is regarded as an attempt to "bear" Welsh prices.

Consumers generally are holding their orders to force Welsh prices to a still lower level.

The Newcastle market is in a better position than it has been during the past two months. Inquiry developed so that merchants are directing their attention to November loading, and business is coming forward satisfactorily. Prospects for December are regarded as good.

Hampton Roads Market at Low Point

Business at Hampton Roads last week, was at the dullest point in the entire year and the price of coal dropped to a point where many shippers were not establishing quotations.

Movement in all directions slackened, particularly in coastwise trade. Bunkers was the only branch of the business that approached any degree of satisfaction. Shippers said that overproduction had flooded the markets with coal, and it might be a long time before it could be moved to a point where normal conditions could be hoped for.

Fair export movement was noted, though the dumpings at the piers were lower than at any time for many months.

French Coal Market Quiet

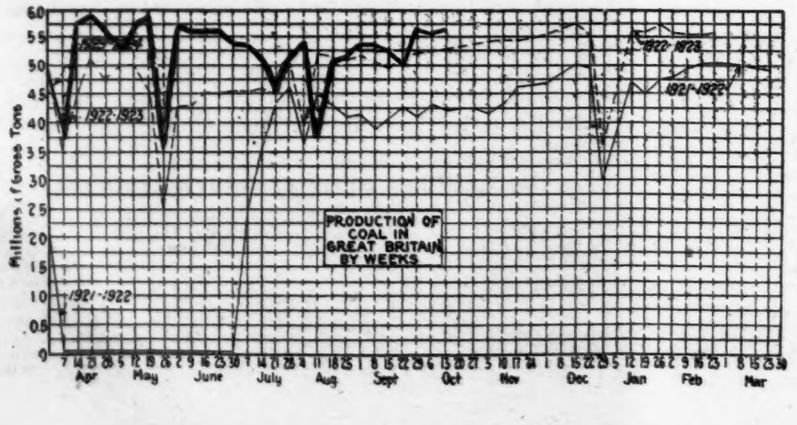
The general trend of the French coal market is quiet. Domestic coals are in fair demand, with prices unchanged. The market for British coal is easier and it is obvious that so long as the rate of exchange remains high and unsettled, French consumers will not be inclined to buy on a large scale. Furthermore, the resumption of indemnity deliveries from the Ruhr is shortly expected to become normal.

During the first nine days of October 42,400 tons of coke were shipped from the Ruhr district to the S.C.O.F. This tonnage was taken from the reserve stocks as none of the French production of the occupied area has as yet been delivered.

United States September Exports by Custom Districts

(In Gross Tons)

	Anthracite	Bituminous	Coke
Maine and New Hampshire	2	6,076	370
Vermont	244	903	912
Massachusetts	91	.....	.....
Connecticut	20	.....	.....
St. Lawrence	73,623	222,873	1,011
Rochester	17,405	65,984	20
Buffalo	61,756	283,950	28,300
New York	6,663	3,887	869
Philadelphia	3,654	28,628	1,700
Maryland	1,209	59,433	11,587
Virginia	4	142,619	.....
South Carolina	.....	25,181	.....
Florida	.....	91	735
Mobile	.....	150	504
New Orleans	.....	351	10
Sabine	.....	.....	2,999
San Antonio	43	263	490
El Paso	336	2,967	312
Arizona	4	1,239	4,129
Los Angeles	3	7	.....
San Francisco	.....	403	14
Washington	420	376	.....
Alaska	.....	14	.....
Dakota	7,055	11,464	2,646
Duluth and Superior	2,115	2,956	991
Michigan	891	139,275	28,535
Ohio	151	769,530	9,345
Totals	175,689	1,768,620	95,479



United States September Coal and Coke Imports

(In Gross Tons)

	1922	1923
Anthracite	17,234	8,695
Bituminous free	1,123,188	3,654
Bituminous dutiable	.....	46,667
Totals	1,123,188	50,321
Imported from:		
United Kingdom	999,227	.....
Canada	93,307	46,729
Japan	.....	90
Australia	28,950	3,500
Other countries	1,704	2
Coke	3,423	1,373

Export Clearances, Week Ended Oct. 27, 1923

FROM BALTIMORE

	Tons
For Cuba:	
Am. S.S. Mangore	5,449
For France:	
Belg. SS. Gasconier	7,762

COKE

For Chile:	
Nor. S.S. Cederic	5,375

FROM HAMPTON ROADS

For Cuba:	
Dan. SS. Phonix, for Antilla	3,213
Amer. SS. Santurce, for Havana	2,287
Br. SS. Berwindvale, for Havana	8,129
For Porto Rico:	
Amer. Schr. J. K. Mitchell, for Maunabo	584
For Holland:	
Br. SS. Explorer, for Rotterdam	8,876
For Brazil:	
Nor. SS. Tilthorn, for Rio de Janeiro	8,491
For South Africa:	
Dan. SS. Nordhavet, for St. Lucia	3,314
For Chile:	
Br. SS. Datchet, for Valparaiso	3,818
For Philippine Islands:	
Amer. SS. Eclipse, for Manila	3,864
For West Indies:	
Nor. SS. Songelv, for Castries	3,507

FROM PHILADELPHIA

For Porto Rico:	
Am. Schr. Cornelius J. Callaghan, for Yubucao	
For Cuba:	
Am. Schr. Elizabeth Freeman, for Caibarien	

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Oct. 18	Oct. 25
Cars on hand	1,132	1,624
Tons on hand	70,531	96,158
Tons dumped for week	99,790	69,795
Tonnage waiting	500	4,500
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,905	1,687
Tons on hand	112,450	102,200
Tons dumped for week	75,274	85,388
Tonnage waiting	3,900	12,314
C. & O. piers, Newport News:		
Cars on hand	2,048	1,606
Tons on hand	108,240	83,665
Tons dumped for week	70,342	76,208
Tonnage waiting	15,025	1,800

Pier and Bunker Prices, Gross Tons

PIERS

	Oct. 20	Oct. 27†
Pool 9, New York	$4.90@$5.25	*$4.50@$5.00*
Pool 10, New York	4.35@ 4.75	*4.00@ 4.75*
Pool 11, New York	4.00@ 4.50	*3.90@ 4.25*
Pool 9, Philadelphia	5.30@ 5.50	*5.25@ 5.40*
Pool 10, Philadelphia	4.45@ 5.00	*4.35@ 4.90*
Pool 11, Philadelphia	4.20@ 4.55	*4.10@ 4.45*
Pool 1, Hamp. Roads	4.75@ 4.85	*4.25*
Pools 5-6-7 Hamp. Rds.	4.25@ 4.35	**4.25@ 4.40**
Pool 2, Hamp. Roads	4.50@ 4.60	*3.85@ 4.00*

BUNKERS

Pool 9, New York	5.20@ 5.55	*4.80@ 5.30*
Pool 10, New York	4.65@ 5.05	*4.30@ 5.05*
Pool 11, New York	4.30@ 4.80	*4.20@ 4.85*
Pool 9, Philadelphia	5.50@ 5.90	*5.40@ 5.80*
Pool 10, Philadelphia	4.95@ 5.30	*4.85@ 5.20*
Pool 11, Philadelphia	4.50@ 4.80	*4.40@ 4.70*
Pool 1, Hamp. Roads	4.75@ 4.85	*4.25*
Pool 2, Hamp. Roads	4.50@ 4.60	*3.85@ 4.00*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	Oct. 20	Oct. 27†
Admiralty, large	27s.@28s.	*27s.6d.*
Steam smalls	18s.	**18s.@19s.**
Newcastle:		
Best steams	25s.	*24s.6d.@25s.*
Best gas	24s.@24s.6d.	24s.
Best bunkers	23s.@24s.6d.	23s.6d.@24s.

† Advances over precious week shown in **heavy type**, declines in *italics*.

News Items From Field and Trade

ALABAMA

The Pratt-Warrior Coal Co. is building ten or twelve employee dwellings at its mine near Pumpkin Center, on the Warrior River, and also is erecting a store for the convenience of its employees.

While making an inspection of the Hamilton slope of the Tennessee Coal, Iron & Railroad Co., near Pratt City, Oct. 17, **J. M. McHugh,** general superintendent of mines; **G. W. Crane,** superintendent Hamilton Slope, and **Harvey McCrorie,** superintendent of Pratt mines, were **painfully burned** about the face and upper portions of the body when a pocket of gas was set off by a lamp of one of the party.

The Gulf States Steel Co. has leased from the Pratt-Warrior Co. the mine of the latter at Ivey Bluff, on the Warrior River, in the southern part of Walker County.

ILLINOIS

The Gartside Coal Co.'s mine No. 4 at Murphysboro will be closed down and abandoned, according to information from that place. The entire mine, both top and bottom, including all machinery, equipment, etc., will be dismantled and disposed of. Robert Niggeman is president of the concern.

H. R. Wilson of Herrin, **has opened a new strip mine** on a farm north of Cambria. The mine is owned and operated exclusively by Wilson.

A voluntary petition in bankruptcy was filed in the United States District Court at St. Louis, Mo., by the **Missouri-Illinois Coal Co.,** listing assets totaling $151,185, and liabilities amounting to $250,993. The assets consist chiefly of two mines in St. Clair County, valued at $100,000, according to the schedule. The company is 35 years old. Officials of the company said that bankruptcy was brought about by the fact that there is no market for coal. The company, they said, lost $100,000 during the last year sustaining a $3,000 monthly payroll loss during that time. They said it cost them $1 to collect each 75c.

INDIANA

A real estate transaction involving the transfer of more than $1,000,000 worth of property was completed in Chicago recently, when Alfred M. Ogle, president of the Vandalia Coal Co., and K. L. Ogle, both of Terre Haute, Ind., exchanged 3,800 acres of improved farm land near Linton, for a flat building containing seventy-two furnished apartments in Chicago. The apartment building, seven stories high, is located at Forty-fifth Street and Drexel Boulevard, only a short distance from the South Shore Country Club. The Ogle farms, which had been in the family for more than fifty years, consist of some of the finest farm land in the state, according to M. R. Mosher, of Indianapolis, the real estate dealer who represented the Ogle family in the transaction. About 2,000 acres are planted in corn.

Judge John E. Cox in Superior Court of Vigo County has granted a petition to **Clem J. Richards, receiver for the Sugar Valley Coal Co.,** asking authority to the extent of $20,000 to pay labor claims and meet other expenses of the company. Frank M. Steiner with a $5,000 claim, was the creditor who petitioned the company into bankruptcy. The mine, which is located a half mile west of West Terre Haute, is said to have in the past furnished more wagon coal to Terre Haute than any other mine in the vicinity. It is not a wagon mine however, but it located on the Vandalia R.R. and last year had an output of from five to six hundred tons per day.

With the **closing down of the Keller mine No. 2 and Crown Hill Mine No. 7** a total of seven mines are now idle in the Clinton field, and 1,800 miners are out of employment. Lack of orders is said to be the cause of the dullness of the mines. Having lost the contract for supplying coal to the steel industry, the mines now are obliged to depend upon the open market. Operators contend that they lost the steel company contracts because the miners put out dirty coal. The miners, on the other hand, hold that the contract was lost because the coal in this field is in competition with that of non-union fields, and that the Pennsylvania and other fields receive lower freight rates than the Clinton field.

The Hickory Grove Coal Mining Corporation, a New York corporation, has qualified to operate in Indiana with a capital of $50,000 preferred and 500 shares common stock no par. Charles M. DuPuy of Riley, is their agent.

Farmers in southern Pike County have been granted **an injunction against the Enos Coal Mining Co. from damming the dredge ditch** of the south fork of the Patoka River constructed at a huge cost. The Enos Coal Company operates three big strip mines, owns thousands of acres of rich coal lands, and operates eight miles of railroad. With less than 3 ft. of water in its fifty-acre lake, the Enos Coal Co. recently petitioned the board of Pike County commissioners for the right to dam the bridge ditch, so as not to endanger its big mines from shutting down for the lack of water. The board of commissioners refused the petition. The coal company started to dam the ditch anyway. Then came the injunction.

IOWA

The Equality Coal Co. has established general offices in Albia. The company's mines are located north of Buxton. The business of the Gold Goose Coal Co. will be handled through the same office in Albia as that of the Equality. The Gold Goose company maintains its mines at Hamilton.

KENTUCKY

The Dixie Gem Consolidated Coal Co., of Middlesboro, capital $10,000, has filed amended articles increasing capital to $60,000.

With a capital of $30,000, the **S. W. W. Coal Co.,** of Pike County, at Sutton, has been chartered by Nora C. and A. C. Walther, of Sutton, and J. M. Smith, of Uniontown, Pa. The same interests formed the **Rockledge Development Co.,** capital $20,000.

The Clearfield Cannel Coal Co., of Morehead, in Rowan County, capital $100,000, has been chartered by Guy Snyder and G. H. Gerheat, of Clearfield and Drew Evans, of Morehead.

MAINE

Bangor retail coal dealers have **advanced the price of anthracite.** The increase ranges from 75c. on stove, egg and nut coal to 25c. on pea coal. The price of bituminous coal remains without change at $11.25 a ton. The new schedule of prices is as follows: Stove, egg and nut, $17.00; pea, $15.50; and steam $11.25. The prices are all subject to a discount of 2 per cent for cash, which the leaders absorb together with a part of the advance at the mines.

MARYLAND

A bridge is being erected by the Consolidation Coal Co. across Georges Creek near Midland, Md., at the Ocean No. 1 mine in order to run loaded hoppers across the stream to connect with the Cumberland & Pennsylvania R.R.

A plant costing $350,000 is to be built at Baltimore for briquetting anthracite dredged from the Susquehanna River. The first unit will have a capacity of 60,000 tons per year.

MASSACHUSETTS

The Joint Special Coal Investigating Committee **has begun an investigation into the two recent increases in the retail price of anthracite,** by publicly calling upon the leading retail dealers of metropolitan Boston to justify their position under oath. Fifteen dealers have been summoned to appear before the committee, with books, papers and other records pertinent to the inquiry, in response to the committee's request. Emergency Fuel Administrator Eugene C. Hultman and Assistant Attorney General James H. Devlin aided the committee in conducting the hearing, which marked the first occasion in which the committee has used the full powers granted to it last May. Witnesses were warned that they were not being compelled to testify, so that they may not claim immunity in the event that proceedings are later instituted by the Attorney General or the District Attorney. Before swearing the witnesses Senator John W. Haigis, chairman of the committee, read a statement outlining the situation leading up to the price increases. The closing paragraph of the committee's statement caused a stir in the hearing room. It read: "The public does not ask charity. It is willing to pay a fair price. It is unwilling to be gouged. The two recent increases, aggregating $1 a net ton, appear to be in part, at least, unwarranted. If they are not unwarranted, the public wants to know why. The purpose of this hearing is to get the facts. We want, and the public wants, the truth, the whole truth and nothing but the truth."

As a result of investigations by the office of the Emergency Fuel Administrator relative to the burning of fuel in home furnaces and heaters, **E. C. Hultman, the administrator, has issued a brochure containing information on preparation of equipment, kinds of fuel, use of anthracite and bituminous coal,** and the use of coke. Much advice is included on how to obtain the best results and least waste.

George Otis Smith, Director of the U. S. Geological Survey and who was a member of the United State Coal Commission, speaking on the coal industry and situation at a meeting of the Boston section, American Institute of Mining and Metallurgical Engineers, at the Engineer's Club, Boston, on Oct. 9, declared **the coal industry to be the most wasteful in the world,** both of capital and man power. "It is wasteful" he said, "from any possible angle of view, and even taking average figures we find extreme inefficiency and waste. The task of alleviating such conditions I lay not to labor or to capital, but to the engineers. It looks like their job to me. One good thing I have found is that, independent of the commission, and largely, I think, through fear of them, **the industry has been investigating itself of late."**

MICHIGAN

The Detroit Stoker Co. announces the appointment of E. L. Beckwith as district manager in charge of the company's Chicago office, address Illinois Merchants Bank Building. Mr. Beckwith is an engineer with many years experience in stoker sales work.

The Columbus (Ohio) office of the **Pittsburgh Coal Co., announces that it will open a Detroit office** about Nov. 1 with Arthur W. Marshall, who has been a salesman with the company for the past 18 years, as manager. For the past few years he had held the position of assistant sales manager. The Detroit office will be in the First National Bank Bldg.

A new coal mine is about to be sunk in Rush township near Owosso by the Copper Coal Mining Co., of Saginaw. Thirty inches of coal under a 300-acre tract is to be opened through a shaft 128 ft. deep.

MISSOURI

T. S. Clark, since 1903 connected with the Western Coal & Mining Co. of St. Louis and the Consolidated Coal Co., and for several years past **auditor for the Western Coal & Mining Co., has resigned** to accept a similar position with the Consolidated Coal Co. of St. Louis, succeeding P. L. Dubois, who died recently.

The coal mine in Elmira is to open again soon, according to reports from officials of the mine. The plant had been closed for more than a month because of a controversy between the operators and the miners.

MONTANA

George N. Griffin, State Coal Mine Inspector, reports that the **mines in Montana produced 3,140,837 tons** of coal in the year ended June 30, 1926. This does not include the output of a few small mines that did not report. The coal mined in the state had a value at the mine of $9,903,625, the greatest of any year since 1901 with the exception of 1920, when $10,393,908 worth of coal was produced. The coal industry gave employment in 1923 to 4,047 men, of whom 1,364 were miners who were em-

ployed on an average of 181 days for the year. Sixteen lives were lost in coal mining compared to only 7 the year previous. There were 196,302 tons of coal produced for each life lost. One person was killed for each 256 persons employed. The mines of the state used 78,399 kegs of powder and 49,339 lb. of dynamite. Fifty-four per cent of the coal was mined by hand, the remaining 46 per cent being mined by the use of machines, the latter giving employment to 169 miners. The inspector finds that "very few, if any, of the coal mines in the state have done anything in the way of first-aid work during the past year. It is to be regretted that operating companies do not take more interest in this matter, for it is the opinion of the writer that money expended along this line brings good returns." He states that in his opinion "if a part of the money paid out in the form of compensation was used in safety-first and first-aid work, the results would be very gratifying both from a monetary and humanitarian standpoint." Miners themselves do not take the interest in safety work that they should, the inspector states, and he calls attention to the fact that safety first-aid work means more to the employees than to the employers.

The King Coal Mining Co. has bought and begun operation of the Star mine of the old Star (Musselshell County) Mining Co. Abe Douglas is superintendent in charge of operations. The company expects to employ about 100 men at the property within the next 30 days.

NEW JERSEY

An involuntary petition in bankruptcy was filed on Oct. 9 in Federal Court at Newark, against the Irvington-Hilton Coal Co., of which the late Mayor Edward R. Folsom of Irvington was president. Louis Folsom, vice-president of the company and son of the late Mayor, filed a petition previously with Vice-Chancellor Foster asking that a receiver for the company be appointed. Vice-Chancellor Foster isued an order directing parties interested to show cause why a receiver should not be named. Federal Judge Runyon appointed Herbert W. Taylor as receiver of the company under $5,000 bond upon application of Barney & Larkey, lawyers, for the creditors.

NEW YORK

Walter B. Johnson, heretofore with Whitney & Kemmerer for twenty-four years, is **now associated with McCann-Camp Co., Inc.,** 90 West Street, New York.

The National Exposition of Power & Mechanical Engineering, to be held at the Grand Central Palace, New York, Dec. 3-8, is planned in co-operation with the national societies interested in the economy of fuel and in the production and use of power. The exposition will parallel the annual meeting of the American Society of Mechanical Engineers, which will be held at the Engineering Societies Building, 29 West 39th St., the first four days of the week. To avoid conflict between the two events, the sessions of interest to those who will attend the Power Exposition have been set for the mornings of the meeting and the exposition will not open until one o'clock each day. This parallel arrangement will give engineers the desired opportunity to enjoy both events to the greatest possible degree. Some of the subjects to be discussed at the annual meeting of the A. S. M. E. are: "Factors in the Spantaneous Combustion of Coal," by O. P. Hood; "Economic Phases of Coal Storage," by F. G. Tryon; "Coal Handling and Coal Storage," by H. E. Birch and H. V. Coes.

The Power Exposition offers an opportunity for the operating man to become acquainted with the latest devices in his field. This opportunity will be seized by the National Association of Stationary Engineers, the New York Building Owners and Managers Association, the New York Building Superintendents' Association, the Blue Room Engineering Society and the Ocean Associations of Marine Engineers, who will attend the exposition in groups The office of the management of the exposition is in the Grand Central Palace.

The committee on coal of the Brooklyn Chamber of Commerce has under consideration **a resolution recommending government ownership of coal.** Prior to the introduction of the resolution Former United States Senator William M. Calder, who is chairman of the committee, reviewed the coal situation in Brooklyn and offered three suggestions in the search for a remedy. One of these was his old plan providing for a government agency with which coal companies and dealers would be compelled to file their price schedules, including costs and profits. The second suggestion was to put coal under the supervision and control of the Interstate Commerce Commission and the third, which he said was "almost radical," was government ownership. J. Whitney Richardson who introduced the resolution said he did not approve of government ownership, but that it appeared the one thing which might awaken the coal operators to the situation they were creating for themselves.

Albert S. Fisher has been appointed manager for Pittsburgh Coal Co. at Buffalo, with offices in the Ellicott Square Building, succeeding Seymour Whitley, resigned. **P. F. Ballou,** formerly connected with the company's Erie (Pa.) office, has been transferred to the Buffalo office. The changes became effective Oct. 15.

More than 20,000 tons of coal stored in pockets of the East River Gas Co., Long Island City, were **consumed on Oct. 13 in a fire** which started in the coal bunkers. The origin of the fire is not known.

The Emerson-Morgan Coal Mining Corporation, New York City, has been incorporated to deal in coal, etc.; capital, 2,500 shares of no par value. Directors: George W. Hinckley, Produce Exchange Building, New York City; Eleanor Tempany and A. M. Menkel, New York City. Attorney, G. W. Hinckley.

Directors of the **Norfolk & Western Ry. have declared an extra dividend of 1 per cent** on the company's common stock in addition to the regular quarterly dividend of 1¾ per cent due to be declared at this time. Both dividends are payable Dec. 19 to stockholders of record Nov. 30. With the extra dividend the company pays 6 per cent on its common stock.

The Pennsylvania Coal & Coke Co. reports gross earnings of $662,309 for September, compared with $1,019,344 for the same month last year. Net income, before Federal taxes, amounted to 14.768, compared with $321,891 for September, 1922. Gross earnings for the nine months ended September 30, last, were $6,787,349, compared with $2,648,264 for the same period last year. Net income, before Federal taxes, was $741,962, compared with $96,334 for the same period last year.

Charles P. Tolman, for sixteen years chief engineer and chairman of the Manufacturing Committee of the National Lead Co. and a past president of the National Safety Council, has resigned to open an office as consulting engineer at 111 Broadway, New York City. His specialties will be dust and fume control, handling materials and products and manufacturing methods and processes. He becomes consulting engineer for the National Lead Co.

The Walter Engineering Corporation, composed of Raymond A. Walter and associates, is opening an office at 299 Broadway, New York City, to make examinations and reports. Raymond A. Walter for the past year was one of the two engineers of the U. S. Coal Commission. With his associates Mr. Walter will make examinations and reports on coal mining, including financing, mergers, reorganization, consolidation, income tax, modern mechanical mining and every phase of development, operation, distribution and marketing.

OHIO

The Morrison & Risman Co., manufacturer of railway track equipment, Buffalo, N. Y., has established a district sales office in the Ulmer Building, Cleveland, in charge of R. B. Morrison. Warehouses also are being established in Cleveland, in addition to warehouse connections at Philadelphia, Buffalo and Lebanon. The company's Philadelphia office has been discontinued.

The Cincinnati Chamber of Commerce completed a "good will" trip by some 100 of its members through the southeastern Kentucky coal fields on Oct. 25, having been gone for five days and visited the more important coal mining centers of Hazard, Harlan and the Jenkins districts. Considerable publicity was given to the great areas of coal that were viewed by these commercial enthusiasts.

The Maher Iron Ore & Coal Co., New Lexington, has been chartered with an authorized capital of $12,000 to deal in coal and mineral lands and to operate coal mines. Incorporators are C. A. Maher, James Maher, William A. Allen, O. H. Trout and George A. Forquer.

The Fenmac Coal Co., Cleveland, has been chartered with a capital of $10,000 to mine coal and to deal in coal and coke, both at wholesale and retail. Incorporators are M. W. Fennelley, W. C. Graves, C. W. McNamara, Clara B. McNamara and Anne Fenneley.

PENNSYLVANIA

Anthracite miners complain that the 10 per cent **wage advance recently granted is having an indirect effect on the cost of living** in some sections of the region. The men say that since they are getting the higher rate, landlords have been increasing their rents. Barbers of the Lehigh section have increased the price of haircuts and shaves. Haircuts now cost 50c. at most shops and shaves from 20 to 25c. Haircutting was done heretofore at 35c. and the charge for shaves was from 15 to 20c., depending on the class of trade.

Rinaldo Cappelini, president of District No. 1, United Mine Workers, last week announced that on Nov. 1 a **compensation bureau, to investigate and contest for all mine workers of District No. 1 will be established.** With this announcement, he also made public these appointments for the important work: Garfield Lewis, of Old Forge, compensation investigator, and Miss Helen Bolton, of Scranton, secretary. Mr. Cappelini explained that the secretary of the mine local union has been instructed to supply the district office at Scranton with a true and accurate account of every mine accident on the day it happens. These cases will be listed, and investigations made. Witnesses will be secured. Medical service will be granted, and when these cases are brought before the compensation referee either in Scranton or Wilkes-Barre, they will be properly prepared, and a fight made to win a fair and just award.

A second conference between Governor Pinchot and Samuel D. Warriner, chairman of the Anthracite Operators' Policy Committee, and other members of the committee, scheduled for Oct. 24, has been **postponed.** Mr. Warriner notified the Governor at Harrisburg that it would be impossible for some of the operators to get to Harrisburg because of board meetings. No date has been set for the meeting.

The Hazle-Brook Coal Co., of Hazleton plans **to make Raven Run colliery,** in the Schuylkill field, **one of the largest operations in the anthracite district.** Raven Run has been taken over from another leasing corporation. It is one of the few operations left in the hard-coal section that have virgin seams to be developed. A new steel and cement breaker is going up, houses are to be built for the miners and it is thought that within ten months the plant will be in full operation.

The Fayette-Greene Coal Producers Association will hold a dinner meeting at the Uniontown Country Club Thursday evening, Nov. 1. The meeting will be addressed by Charles O'Neil, secretary-treasurer of the Central Pennsylvania Coal Operators Association.

The Sesslar Coal Co. has been organized at Uniontown by James T. Sesslar and associates, capital, $30,000.

The Kimberly Crest Coal Co. is a new corporation at Somerset; capital, $50,000.

A contract for uncovering coal measures stretching from Oneida colliery to the Green Mountain line of the Lehigh & Wilkes-Barre Coal Co., five miles away, has been awarded by the Lehigh Valley Coal Co. The project will require two years for completion. Steam shovels will be used to take the clay off the anthracite outcrops and a network of temporary railroads will be built to haul away the debris to dumps beyond the coal measures. The coal taken out will be hauled 11 miles overground to the Jeanesville breaker for preparation for market.

The proposed merger of the Philadelphia & Reading Ry. and the Central Railroad of New Jersey with the New York Central R.R., which was given much consideration at the annual meeting of the State Chamber of Commerce at Harrisburg last week, is being studied by a special committee of the state organization appointed by Alba B. Johnson, president of the State Chamber. **Opposition to the merger was voiced** in a resolution sent to the Committee on Resolutions, which in turn reported out a resolution favoring further study of the matter and the appointment of the committee. Speakers announced that the plan, if carried out, would result in much of the anthracite being taken to the Port of New York instead of Philadelphia and that other traffic would be diverted. President Johnson named the following committee, which will meet with him at Harrisburg, Nov. 6: E. J. Poole, chairman, Reading, sponsor of the original resolution condemning the merger; Jesse S. Bell, Williamsport; Harry C. Graham, Pittsburgh; John S. Rilling, Erie; Worthington Scranton, Scranton; Vernon F. Taylor, Indiana; John Uhl, Wilkes-Barre; Charles P. Vaughan, Philadelphia, and F. W. Walker, Beaver Falls.

The Straub-Atkinson Coal & Coke Co., Pittsburgh has changed its name to the Arch H. Straub Coal & Coke Co.

WEST VIRGINIA

The Cagey Coal & Coke Co., of Fairmont, has filed notice of incorporation in the offices of Secretary of State Houston G. Young; capital stock, $25,000; incorporators, Harry Marshall, of South Brownsville, Pa.; J. W. Davis, of Hopwood, Pa.; D. F. Fries, of New York City; S. J. Titus, of Jefferson, Pa.; John A. Allen, of Smock, Pa.; A. C. Lee, of Masontown, Pa.; George H. Krepps, of East Millsboro, Pa.; Lloyd W. Cagey, of Point Marion, Pa., and E. J. Newcomer, of Uniontown, Pa.

New River coal lands will be developed by the Cap Smokeless Fuel Co., which has just been chartered with a capitalization of $75,000. The offices of the company for the present are to be at Charleston. Identified with the new company are William W. Burdette and Anis Burdette, of Handley; C. A. Purcell, M. P. Albertson and W. A. O'Neal, all of Charleston.

No. 2 mine of the Low Moor Co., at Fayette, which had been closed down for a short time, **has resumed operations.** Preparations are under way at the No. 1 mine of the same company to screen the output owing to the better demand for prepared sizes.

That coal lands in the Glenwood section of Ohio County are to be developed is indicated by the organization of **Wheeling-Glenwood Coal Co.**, with a capitalization of $50,000. Offices of the company are at Wheeling. Incorporators of the new concern are E. L. Peters, V. H. Crites, Frank Hembert, Harry Long and V. B. Travis, all of Wheeling.

Men well known in the coal industry have taken out a charter for the **National Coal Inspection Bureau, Inc.**, with a capital stock of $50,000. There has been a good deal of discussion of such an organization in the trade recently, its purpose being to insure the shipping of coal of better quality and to put a stop to the rejection of coal of quality, all through a system of inspection much like that utilized in the lumber industry. Incorporators of the Bureau are Justus Collins, president of the Smokeless Fuel Co., Charleston; O. J. Cox president of the Kanawha Valley Coal Co., Charleston; L. B. Ramsey, of the Logan Fuel Co., Charleston; H. P. Elliott, general manager of the Stange-Elliott Coal Co., of Charleston, and W. D. Roberts, of the **National Coal Mining News**, Charleston.

Organization of the Jaunda Mining Co., with a capital stock of $130,000, presages further development of coal lands in the Kanawha County field. The company will have its office at Charleston. Identified with the new enterprise are J. W. Keeney, of Eskdale; C. W. Estep, H. A. Stewart, Milton Crites and L. Jaffe, all of Charleston.

Work has been completed by the **West Virginia Coal & Coke Co.**, on its new store building and also on its new office building at Norton, in the Elkins field. The total cost of the two structures is about $40,000. The company will also erect a new and modern tipple at its Junior plant when conditions justify it, to replace the one destroyed by fire.

The Pinnacle Coal & Coke Co., of Spring Forks, has been authorized to increase its capital stock from $500,000 to $750,000.

Operations in Pocahontas territory will be undertaken by the Royal Pocahontas Coal Co., which has just been organized with a capital stock of $20,000. This company will operate in the vicinity of Iaeger, which will be the headquarters of the company. Having an active part in organizing the new company were T. B. Lane and Carmie G. Lane, of Iaeger; H. H. Liggett, A. F. Meyer and Marguerite L. Marsh, of Cincinnati, Ohio.

WISCONSIN

Senator Irvine Lenroot, speaking at Marshfield on Oct. 12 announced he **will support governmental regulation of the anthracite industry** and control of coal prices that the public may be protected against profiteering, as recommended by the Commission created by the last Congress. Following closely the findings of the Commission, the Senator said there should be little or no increase in the price of anthracite by reason of the recent advance in wages, "for a reduction of the net profits of the operators to a reasonable basis will absorb nearly all of the increase in wages." Since the anthracite industry has been found to be an excessive profit-making monopoly it is proper that it should be brought within by the government, he pointed out.

WYOMING

The U. S. Land Office at Evanston, has been directed **to offer for lease a tract of 480 acres of public land** in Unta County, 14 miles south of Kemmerer and about 1½ miles east of Cumberland, on the Cumberland branch of the Wyoming Western R.R., **containing several thick beds of high-grade bituminous coal.** Lease for this tract will be at a government royalty of 10c. per ton for coal mined, a minimum investment in mining operations of $75,000 during the first three years and a minimum production of 45,000 tons of coal a year beginning with the fourth year.

WASHINGTON, D. C.

Senator Oddie, of Nevada, has practically completed preparation of **a bill creating a Department of Mines**, whose head shall be a Secretary of Mines with a seat in the President's Cabinet. The Senator plans to submit the proposed bill to mining interests for analysis before its introduction when Congress convenes in order to obtain the advice and suggestions of those interested in the mining industry, as well as of government departments and bureaus to be affected thereby.

Walter D. Rogers has joined the National Retail Coal Merchants' Association as assistant secretary. He was with the U. S. Coal Commission and is one of the authors of the Commission's report covering the retail trade. He had charge of the Commission's investigation in Boston, Mass., last

WALTER D. ROGERS

winter and also made special cost studies for it in New York City and Washington, D. C. His experience as a Congressional secretary in Washington and his experience in New York City as an auditor and credit manager should make him a strong man for the association. Mr. Rogers served two years in the United States Army during the war, and for a year afterward was with the American Red Cross.

That research on mining problems be coordinated and that new work be undertaken on a co-operative basis has been proposed by the British government, and the plan has been approved by the American State Department. The Department of the Interior has been authorized to proceed directly by the British Board of Trade in the perfecting of the arrangement. The action of the British Government is an outgrowth of the recent visit to that country of George S. Rice, chief engineer of the U. S. Bureau of Mines. While in England Mr. Rice had frequent opportunity to point out the character and scope of the research being conducted in this country. British mining engineers were impressed with the fact that the research in that country was along almost identical lines. The arrangement is being entered into with the idea of avoiding duplication and making possible a greatly enlarged program. Mr. Rice was elected an honorary member of the British Institution of Mining Engineers. Lord Curzon, the Foreign Minister, has formally conveyed to the State Department the thanks of the British Government for the constructive suggestions and advice conveyed by Mr. Rice during his visit.

The U. S. Supreme Court on Oct. 22 **denied a writ of certiorari sought by the Sandford Coal Co.** of Illinois to review a decision of the lower courts awarding a judgment of $41,409, including interest, to the Wisconsin Bridge & Iron Co. for a tipple at a mine in Williamson County, Ill. The judgment therefore stands. The coal company did not deny ordering the tipple, but in the suit set up a counter claim for damages on the ground that it had suffered losses due to delay in installing the tipple. This claim the lower courts refused to entertain in the suit at issue. The tipple was ordered in November, 1919, to be completed July 1, 1920. In the meantime the development of the mine proceeded with a temporary wooden tipple of limited capacity. The steel tipple was not completed, the coal company alleged, until in December, 1920, although it was put into use in October previous. Because of this delay, the coal company alleged it had lost business as its output was restricted to 150 tons daily whereas with proper tipple equipment it could have raised, and sold, 760 tons daily.

The Federated American Engineering Societies announced that **Arthur P. Davis**, whose recent dismissal as Director of the U. S. Reclamation Service by Secretary of Interior Work caused a nationwide protest by engineers, **has been retained by the State Department as technical adviser** in connection with certain claims against the United States by British citizens which are to be tried before the Pecuniary Claims Arbitration Commission in London beginning Nov. 6. The arbitration of these claims was provided for by a special law of Congress to clear the docket of old pending claims which have not been settled. Mr. Davis sailed for England Oct. 23 to assist in the preparation of these cases prior to their consideration.

CANADA

The coal miners of Nova Scotia have requested the management of the Dominion Coal Co. **to set a date at which a new wage contract will be discussed.** Union officials have for some years been endeavoring to change the date for the termination of contracts from December to April, at which time all contracts in the American and Western Canadian coal fields terminate, but so far have not been successful.

F. A. Coombe, a Montreal steam and combustion engineer, chairman of the Fuel Committee of the Engineering Institute of Canada, has been engaged **to make an exhaustive report on the feasibility of establishing central heating plants in Canada.** The investigation will be conducted under the supervision of the Dominion Fuel Board, and the report must be completed within six months. Particular attention will be given to the saving that can be effected by the use of low-grade fuel in these plants.

The Dominion Coal Co. will spend $2,000,000 in opening up a new mine at Lingan, construction of a branch railway to the site having been started. The new colliery will be equipped with the most modern devices. It will tap the Phelan seam and have a capacity of 2,000 tons daily.

J. B. MacLachlan, deposed district secretary of the United Mine Workers of America, was **convicted at Halifax, Oct. 17 of sedition and spreading false tales.** Throughout the trial MacLachlan maintained a confident air and the worst he looked for, apparently, was disagreement by the jury. At the conclusion of the hearing he was taken back to jail to remain until the last day of the month, when sentence was to be pronounced. The general feeling is that the verdict is a just one and that the prisoner could expect nothing else from an unbiased jury. It may be that counsel for MacLachlan will appeal the verdict, but it is questioned if a better decision could be had from the full bench. The trial of Dan Livingstone, former district president of the U. M. W., has been postponed until the next sitting of the Supreme Court. He will be given hearing on similar charges to those on which MacLachlan was convicted.

JAPAN

A letter just received by H. Foster Bain, director of the Bureau of Mines, tells of the escape from injury of several prominent Japanese engineers who were in Tokio at the time of the earthquake, among them **Dr. Takuma Dan**, who is well known in this country. He was educated at the Massachusetts Institute of Technology and is one of the partners in Mitsui & Co. He developed the Manda coal mine in southern Japan. In the development of this mine the most modern mechanical equipment has been used. Owing to the large amount of water which had to be handled, Dr. Dan designed special pumps for it. When the designs were received by the pump manufacturers, they held up work on the order until they could cable to make sure that the decimal points were in the right places. As the pumps were the largest ever manufactured at that time, the manufacturers feared that someone had slipped a decimal point. Incidentally these pumps, after many years, still are being operated satisfactorily.

Obituary

John A. Clark, one of the best known coal operators of northern West Virginia, died Oct. 19 at his home at Fairmont, W. Va., after an illness covering a period of several years. Mr. Clark was born at Cumberland, Md., in 1855. After considerable experience he became an independent coal operator on April 1, 1891, when he organized the Clark Coal & Coke Co. with a mine at Pritchard on the Monongahela River Railway. Later he opened a mine at Anderson and a mine at Chiefton. He purchased the mine of the Pitcairn Coal Co. in 1910 and organized the Harry B. Coal & Coke Co., making his three sons his associates, Mr. Clark becoming the president of the company. A few years later he organized the Car-Diff Smokeless Coal Co. and the Dixie Mining Co., these companies being operated as separate concerns until the organization of the Clark Coal & Coke Co., in February, 1922. About 1899 Mr. Clark organized the Columbia Coal & Coke Co., at Columbia, and the Fairmont & Baltimore Coal & Coke Co., at Adamston, those companies later being purchased by the Fairmont Coal Co., now the Consolidation Coal Co. In 1901 the Waldo mine at Wilsonburg was opened as was the Goff mine, the New Chiefton and the New Randolph, which were operated as properties of the Madeira Hill-Clark Coal Co. Funeral services were held at the family residence at Fairmont, Oct. 21, burial being at Woodlawn Cemetery. His wife and three sons survive.

P. W. (Pat) Wickham, general superintendent of the mine properties of the New York Coal Co. in the Hocking field, died at Nelsonville, Ohio, Oct. 17, after a brief illness. He was 48 years old.

General James Lewis Caldwell, one of the pioneer figures in the development of the coal resources of southern West Virginia, died Oct. 18. General Caldwell, who was a veteran of the Civil War, president of the First National Bank of Huntington and head of the Dingress Run Coal Co., with extensive holdings in Logan County, succumbed to an illness covering a period of eight months resulting from an attack of influenza. General Caldwell was born at Elizabeth, in Wirt County, W. Va., on May 20, 1846. In 1862 he joined the Union forces and served until the end of the war. A few years after organizing the First National Bank of Huntington, of which he was president for almost forty years, Mr. Caldwell built the Guyandotte Ry., which is now a part of the C. & O. system, that road leading to the Logan field, where Mr. Caldwell acquired much coal acreage. The Dingress Run Coal Co., of which he was the president at the time of his death, is said to own 30,000 acres of coal land in Logan County on which twenty mines are operating. He also was secretary and treasurer of the Logan Cannel Coal Co. at the time of his death. Funeral services were held at the First Presbyterian Church of Huntington Oct. 20. The widow and six children survive.

Jake Brady, president of the Brady-Tucker Coal Co. died Oct. 22, following an operation for appendicitis at Christ Hospital. Mr. Brady was reared in the coal business, his father having been associated with several retail and wholesale companies of Cincinnati. He started with Kewett, Bigelow & Brooks as a lad of twenty and worked himself upward until his appointment as general manager of sales some fifteen months ago. After a re-arrangement of the selling department of that company Mr. Brady formed the Brady-Tucker Coal Co. with Larry Tucker, who had been with the Central Fuel Co., and his firm prospered despite the hard times that have beset the trade in the last year. He had been ill only a few days when the end came. He was thirty years of age.

Trade Literature

Welding and Cutting Equipment. Torchweld Equipment Co., Chicago, Ill. Catalog 23. Pp. 40; 8x11 in.; illustrated. Cross-sectional views with detailed explanation of oxyacetylene welding and cutting apparatus, lead welding, soldering, brazing and decarbonizing units, gas-pressure regulators, automatic machines, generators and supplies are included.

Bethlehem Steel Co., Bethlehem, Pa., has issued an interesting little book, Publication No. 26, describing the nature and uses of **Mayari Pig Iron.** Some useful data compiled especially for the book by Dr. Richard Moldenke are included. Price, $2.00.

Motorbloc — The Motor-Driven Hoist. Motorbloc Corp., Summerdale, Philadelphia, Pa. Bulletin S-101. A 6-page folder describing and illustrating the lightness and portability of the device.

Publications Received

Erection of Barricades During Mine Fires or After Explosions, by J. W. Paul, B. O. Pickard and M. W. von Bernewitz, Bureau of Mines, Washington, D. C. Miners' Circular 25. Pp. 27; 6x9 in.; illustrated. Contains short description of some of the gases found in mines, tells what to do at time of fire or explosion, with practical recommendations, and gives life-sustaining capacity of barricaded chambers. Experiences of erection of barricades at mines during explosions are included.

The Morse Chain Co., Ithaca, N. Y. has issued in book form the address by F. L. Morse at the 26th annual convention of the American Mining Congress on **"Power, Its Application from the 17th Dynasty to the 20th Century."** The book has 46pp., is 6x9 in. and well illustrated.

Analyses of Illinois Coals, by G. W. Hawley, Illinois Mining Investigations, Urbana, Ill.; prepared under a co-operative agreement between the Illinois State Geological Survey Division, the Engineering Experiment Station of the University of Illinois and the U. S. Bureau of Mines. Co-operative Mining Series. Extract A from Bulletin No. 27. Pp. 68; 6x9 in.; tables.

Traffic News

Rates on coal from Winton, Wyo., to destinations in various Western states have been found by the Interstate Commerce Comission to be **unreasonable** to the extent that they exceed the rates in effect at the time from the Rock Springs-Kemmerer group in which Winton was subsequently included. As a result of that decision, reparation has been awarded covering shipments made by the Megeath Coal Co.

The Interstate Commerce Commission will hold its **hearings into anthracite freight rates** from Pennsylvania to Canada, New York and other northeastern states at Albany, N. Y., Nov. 5, according to an announcement Oct. 17 by the New York Public Service Commission.

The Southern Appalachian Coal Operators' Association was **unsuccessful in its efforts to establish that freight rates charged from mines in its territory to Louisville, Ky., are unreasonable and preferential** to competing coal operators in western Kentucky. The Interstate Commission, in a formal opinion handed down Oct. 26, holds that the rates are not unreasonable or unduly prejudicial. The Commission pointed out that if the rates from western Kentucky to Louisville were increased, it would not benefit the Southern Appalachian operators but simply would give a greater advantage to mines served by the Illinois Central. The Commission points to the statement that Illinois mines are capable of increasing their tonnage intended for Louisville sufficiently to displace all coal now shipped to that city from mines on the Louisville & Nashville. The Commission also made the point that shipments to Louisville from Southern Appalachian territory are increasing, whereas those from western Kentucky mines are decreasing.

Hereafter, according to announcement just made, the **Norfolk & Western Ry. will accept privately owned cars as "assigned" or privately owned equipment.** Heretofore the N. & W. has steadfastly refused to handle privately owned cars as other than the general run of cars and has so allotted and distributed such equipment. In some quarters it is expected that the mining companies controlled by Henry Ford will take advantage of this opportunity to use D T. & I. equipment. It is certain that more companies would have taken advantage of the new ruling if it had been made a year ago when the spot market was stronger.

Hearing into the complaint filed by coastwise steamship and towing companies **that charges for dumping, trimming and other port services at the three coal terminals at Hampton Roads are unreasonable and unjust** were in progress at Norfolk all last week, before Examiner W. A. Disque, of the Interstate Commerce Commission. The complaint was filed in April by the Coastwise Transportation Corporation, of Boston; the Southern Transportation Co., of Philadelphia; the Eastern Transportation Co., of Baltimore; the Staples Transportation Co., of New York; the Neptune Line, Inc., of New York, and the Thames Towing Co., of New London, Conn. Defendants in the hearing are the Norfolk & Western Ry., the Virginian Ry., the Chesapeake & Ohio Ry., the Lines Co., the Lamberts Point Towboat Co., and F. R. Barrett, stevedore. Witnesses for the complainants introduced testimony in efforts to substantiate the charge that the costs to the steamers and tows handling transhiped coal for New England were too high. Comparisons were made with the same services performed at Baltimore and Philadelphia to show that it was relatively higher at Hampton Roads than at those two competitive ports. Examiner Disque will report on the testimony taken and the decision is not expected for several months.

Coal rates to a large number of Indiana towns have been attacked by the Community Traffic Service Bureau, of Anderson, Ind. The Bureau claims that points east of Indianapolis and south of the line of the Big Four from Indianapolis to Union City, inclusively, have been paying a higher rate than is warranted. The destinations involved are located similarly to Indianapolis as far as service on West Virginia and Kentucky coal is concerned, it is claimed. Similar claims are being made as to rates on the Chicago, Indianapolis & Louisville north of Indianapolis as far as Monticello and to certan points on the Pennsylvania and Big Four west of Indianapolis. It is declared that certain points receiving switching service from Indianapolis yards have been compelled to pay the Chicago rate on coal, despite the fact that the latter point is 200 miles further away with a difference in rate over Indianapolis of 63c. a ton. It is stated that the rates from the Illinois fields and other territory into Indiana have been on a very much lower basis than the rates complained of. The whole situation is said to grow out of the zoning system put into effect by the Fuel Administration during the war. There are other special features involved, including alleged violations of the third and fourth sections of the act to regulate commerce.

The railroads on Oct. 17 moved more freight cars, both loaded and empty than ever before on any one day in history, according to a report by the American Railway Association. Fifty-two Class 1 railroads, representing about 90 per cent of the mileage for that class of carriers, on that day moved 1,029,428 cars. Between May 19 and Oct. 13, inclusive, the latest figures available, more than one million cars have been loaded with revenue freight in seventeen different weeks. In thirteen of those weeks the record loading which was made during the week of October 14, 1920, when the total was 1,018,539 and which stood until this year, has been exceeded. The present record loading of 1,097,274 cars was made during the week of Sept. 29 this year.

It is generally understood in coal circles in southern West Virginia that **D. H. Maher, president of the Norfolk & Western, will retire** as such on Jan. 1, 1924, having reached the age limit. Mr. Maher has been connected with Norfolk & Western for many years and ranks high as an executive. There is a good deal of speculation as to who will succeed the retiring president, in the event that he retires.

Reports just filed by railroads show that **only 151,332 freight cars out of a total number owned of about 2,300,000 were in need of repair on Oct. 1** this year, or 6.7 per cent. This compares with 216,011, or 9½ per cent on Jan. 1. The railroads on Oct. 1 also had only 9,823 locomotives, or 15.3 per cent of the number on line, in need of repair. On Jan. 1 this year, 15,549, or 24.1 per cent, were in need of repair.

Coming Meetings

Harlan County Coal Operators' Association. Nov. 21, Harlan, Ky. Secretary, E. R. Clayton, Harlan, Ky.

Second National Exposition of Power & Mechanical Engineering. Grand Central Palace, New York City, Dec. 3-8. Managers, C. F. Roth and F. W. Payne, Grand Central Palace, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.